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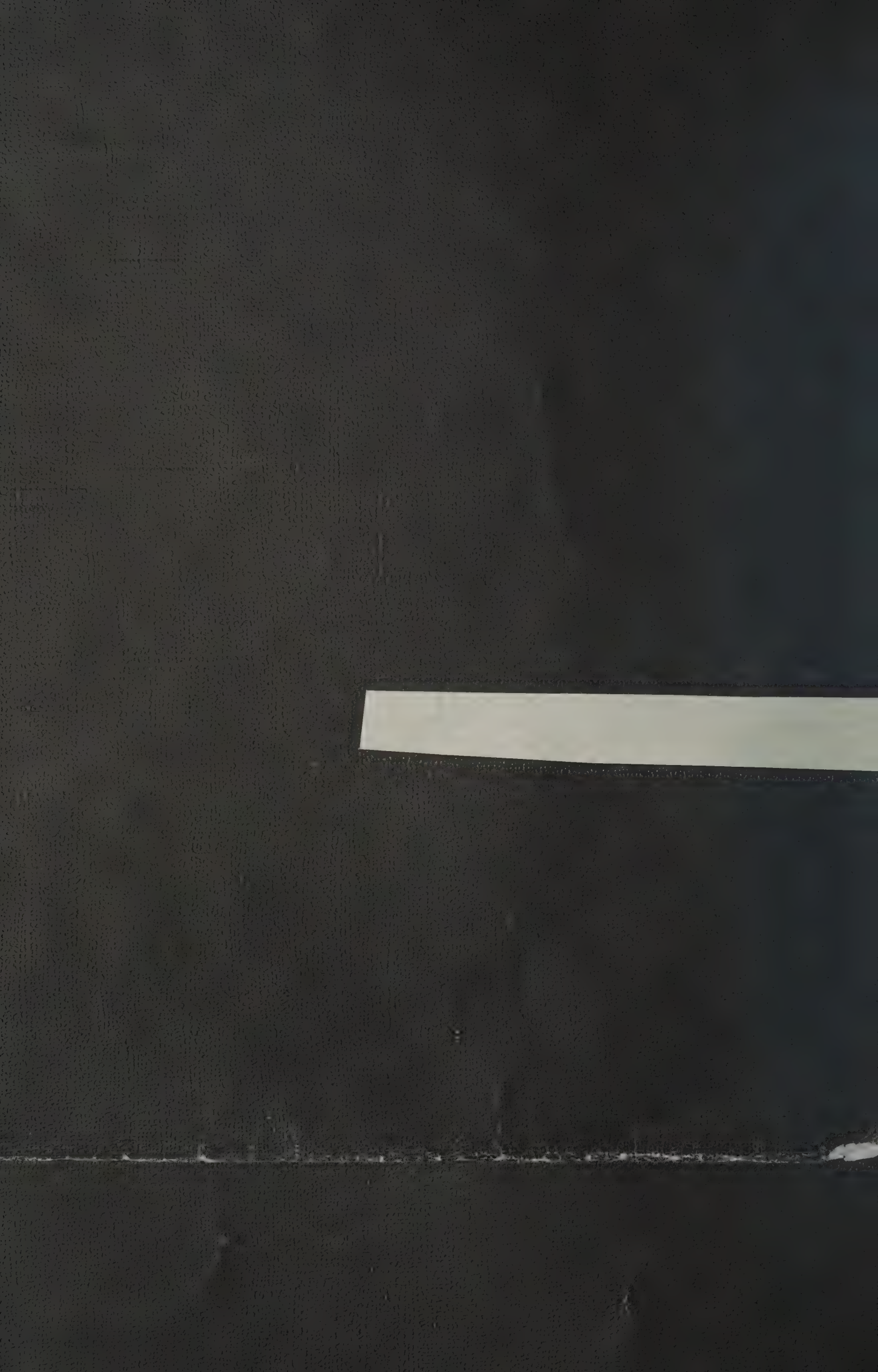
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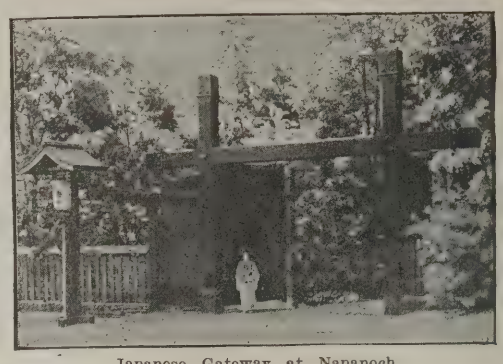
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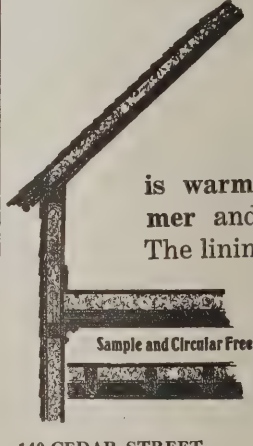
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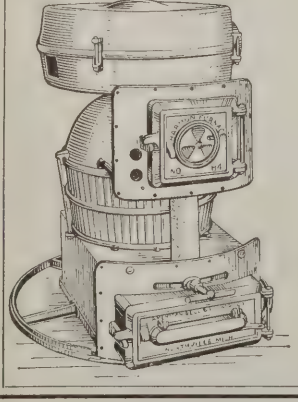
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THE BUILDING AGE

NEW YORK, JANUARY, 1916

A Frame House of the Chalêt Type

A Well-Considered Design in a Most Picturesque Setting—A Few Details of Construction—Cost $4,300

By Charles Alma Byers

LIKE the bungalow, the Swiss chalêt is a style of architecture that, in this country, is variously interpreted. Although it must always retain certain characterizing lines and features, it is largely a creation of individuality. And like the bungalow also, it permits these liberties with perfect grace, for, if made by a skilled and conscientious builder, the house evolved from individual interpretation of the style will invariably constitute an attractive and comfortable home. The chalêt, however, has a certain important advantage over the bungalow in that it is more universally adaptable to different climates. In fact, it is a style that can be employed just as satisfactorily in one section of the country as in another.

The house here shown is an excellent example of the Swiss chalêt style, and possesses many admirable features, from both the exterior and the interior point of view. In general design, it shows marked individuality, and has a good, substantial appearance. Its siding is of sawed redwood shakes, laid in a very attractive manner, and the excellent arrangement of the straight-lined finishing timbers gives it an effect that is truly artistic. A care-



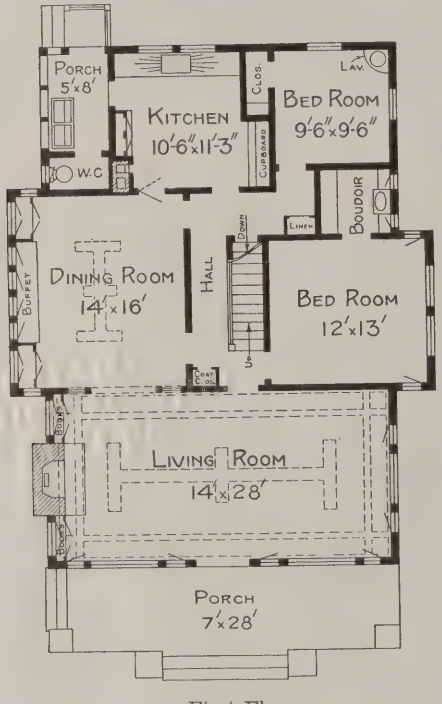
A Frame House of the Chalêt Type—Architect and Builder, Edward E. Sweet, Los Angeles, Cal.

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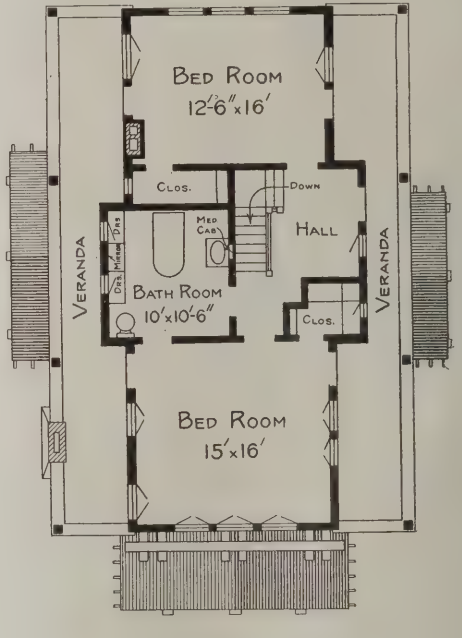
ful study of the exterior view is well merited.

The foundation is of concrete, but the chimney and porch piers are mainly of pressed brick, a few clinker brick being worked into them to give a slight rustic effect. The roof is but mildly pitched, which is quite satisfactory in Southern California, where this house was erected, but in other localities it may be given any angle necessary to meet local conditions. The roof covering here used is a gray asbestos composition, but in many places shingles will probably prove equally satisfactory. The wide overhang of the eaves and gables constitute a characteristic of the chalêt, and should be invariably maintained.

A feature that, because of its style, helps materially to enhance the outside appearance of this house is the front porch, which virtually extends across the entire front, but is covered only in the center portion by what might be termed a marquise. The flooring is of cement, edged with brick, and



First Floor



Second Floor

A Frame House of the Chalêt Type—Floor Plans—Scale 1/16 *In. to the Foot*

ing baskets help to add charm to these truly delightful outdoor retreats.

To give a still greater artistic appearance to the exterior of this house, or to overcome any possible appearance of plainness at these points, there is a slight projection to the walls of the first story, on either side at a point about midway between the front and the back, and these projections are each covered with a small individual roof. On one side it is the dining room that projects beyond the main line, and on the other side it is a bed room.

The exterior color scheme is quite effective. The siding shakes are stained a light brown color, and the finishing timbers are painted a very dark brown shade. The roofing, as already stated, is gray, and the brick work is naturally a dark red.

Inside the house is comfortable and home-like. More than that, it possesses a number of distinctive features in the way of decorative and built-in effects. The finish is in good taste, and creates a dignified appearance without depriving the rooms of coziness. The different rooms deserve to be studied in more or less detail, and as an assistance in doing so the interior views of the living room and of the dining room should be closely observed. The arrangement and dimensions of the rooms may be noted from the floor plans here shown.

The living room, which extends across the entire front, is long and comparatively narrow. The front door is exactly in the center, and at either side are a broad plate-glass window and two small casement windows. These, with other windows in each end, give the room a great deal of light. In one end is an excellent fireplace with built-in book cases at either side, the whole being of particularly striking and artistic design. Not only is the fireplace constructed of brick, mainly of the clinker kind, but the book cases are also of brick, as well as the broad hearth. The counter-shelf of the fireplace is on line with the shelf-like tops of the book cases, an excel-

the low, broad steps are also of brick. Four low, pedestal-like piers are arranged along the front, one at each corner and one on each side of the front steps. These, acting as rests for potted plants, are purely decorative, for they do not help to support the roof in any way. The little individual roof is, instead, supported at the outer end by chains from above. The arrangement of these chains, together with the dependent timbers, should be particularly studied by the prospective builder of a house of this type.

Another admirable feature of the exterior is found in the long, airy balconies of the second floor. There is one of these on each side, running the full length, both identical in dimensions and design—both open at each end and along one side. They are inclosed with low, solid balustrades, and are roofed and ceiled. They are sufficiently wide at each end to be used for sleeping purposes, and may be easily inclosed, if desired, with roll curtains. Hang-



View in the Living Room as Seen from the Fireplace End—The Main Entrance Door Is at the Right



A Frame House of the Chalêt Type—View of the End of Living Room, Showing the Fireplace and Mantel

lent arrangement, and above each book case is a small window.

The ceiling of the room is beamed in a rather original fashion, which is especially effective, and from the center beams projects a total of seven electric-light globes. A paneled wainscot covers the lower half of the walls, and above this point a paper of distinctive and artistic pattern is used. The woodwork, which is of cedar, is finished in fumed oak color, and the flooring, as in all of the first-floor rooms, is oak.

The Dining Room Buffet

The dining room contains a buffet that is indeed a masterpiece of work. It extends the full length of the outside wall, and is unique not only because of its broad sweep but also for the reason that brick work forms a prominent feature of its construction. In fact, it is built almost entirely of brick, with the exception of the doors and drawers and counter-shelves. The center part of the buffet is extremely low, and contains two cabinet sections and one department of drawers. Above the counter-shelf are four casement windows; and in the corner at each end is a small china closet, the top of which also forms a shelf. Smaller windows are placed above each of these.

The ceiling is beamed in somewhat the same style as in the living room, and, besides the center chandelier, there are four small ceiling-light globes. The walls are paneled to the height of the doors, and along the top of the paneling runs the usual plate rail. The frieze above is of paper, of dignified pattern. The woodwork, as in the living room, is of cedar, and is similarly finished.

The Kitchen Equipment

The kitchen is of the so-called cabinet kind, which means that it contains nearly every possible built-in convenience, in the way of cupboards, cabinets, flour bins, etc. It also possesses a draught cooler. Both the woodwork and the plastered portions of the walls of this room are white enameled.

Off of the kitchen is a screened porch, with stationary wash trays, as well as a lavatory.

There are two bed rooms on the lower floor, and a small hall forms the necessary connections between these rooms and the remainder of the house. One of the bed rooms has a small dressing room, and the other possesses a roomy closet. The hall contains a closet for coats and wraps and a small linen closet. The woodwork of the rooms, as well as the hall, is enameled white, and the walls are papered.

From the hall rises the stairway to the second floor, as well as descends the stairway to the basement. A furnace, located in the 10 x 14 ft. basement, supplies heat to the different rooms. The basement is walled and floored with concrete.

On the second floor are two large bed rooms, each with a closet, and the bath room. The bath room contains, besides the usual fixtures, a linen cabinet and a medicine chest. Maple flooring is used throughout the second floor. The woodwork and plastered walls of the bath room are enameled in ivory tone, and the woodwork of the remainder of the second story is painted a light buff color, while the walls are tinted in delicate shades. Both bed rooms are exceptionally well lighted with windows, each possessing windows on three sides.

The principal framing timbers of this house are of the following dimensions: Mud sills, 4 x 6 in.; girders, 4 x 4 in.; first-floor joists, 2 x 8 in.; floor joists over basement, 2 x 10 in.; second-floor joists, 2 x 10 in.; ceiling joists, 2 x 4 in.; rafters, 2 x 4 in.; collar ties, 2 x 3 in.; ridge poles, 1 x 6 in.; plates, 2 x 4 in.; studding, 2 x 4 in.; underpins on piers, 4 x 4 in.; underpins on outer walls, 2 x 4 in.

The exterior vertical walls are covered with ⅞ x 7-in. Oregon pine sheating, placed diagonally. The sawed Redwood shakes are laid in alternate courses with exposures of 8 in. and 3 in. to the weather, and the belt courses are of 2 x 6 in. Redwood. The exterior stain used is composed of Princess red, lampblack, distillate and boiled oil, the latter constituting a fourth part of the liquid.

The overhang of the roof at the eaves and gables is 2 ft. 6 in. The covering of the roof, an asbestos-like composition, is "Silveroid," made by the Pioneer Paper Company of Los Angeles, Cal.

The sizes of the different rooms are shown by the accompanying floor plans, as already stated. The ceilings of the first-floor rooms are 9 ft. high and of the second-floor rooms 8 ft. 6 in. The paneled wainscot in the living room extends to a height of 4 ft. 6 in., which is also the height of the built-in book-cases and the fireplace mantel shelf. The plate shelf of the dining room, at the top of the paneling, is located approximately 7 ft. 6 in. from the floor, and the china closets reach to a height of 5 ft., while the counter-shelf of the buffet is about one-half this height. The woodwork of these two rooms is stained with Johnson's Wood Dye, made by S. C. Johnson & Son, Racine, Wis.

The furnace is of the hot-air type, called a "Browne," and was made by the Phillips Heating & Ventilating Company of Los Angeles.

This house was recently built in Los Angeles, Cal., at a total cost of $4,300, and is the home of Thomas Haywood. Edward E. Sweet, a well-known architect of the city named, was the designer and builder.

Death of Frederick W. Dodge

Architects and builders throughout the country will regret to learn of the death of Frederick W. Dodge, president of the F. W. Dodge Company, which occurred at his home in New York City on the morning of Nov. 10. He was born in Melrose, Mass., Jan. 24, 1864, and was 51 years old. In 1891 he founded the company in question in Boston, and in the following year opened a branch office in New York City, where in 1896 he formed a partnership with C. W. Sweet, publisher of the *Architectural Record*, the *Record and Guide*, and *Sweet's Catalogue*. Shortly afterward the head office of the F. W. Dodge Company was transferred to New York City and its business of issuing daily building reports as devised by its founder was rapidly extended to other large cities. At the time of his death Mr. Dodge had been for several years one of the largest publishers of the country in the architectural and building trade fields, several of his publications being issued in New York, Chicago, Pittsburgh and other Western cities.

Some "Wrinkles" in House Building

Suggestions Regarding Constructive Features Likely to Interest the Young Builder in the Smaller Country Towns

By G. L. McMurphy



WHILE the framing of ordinary houses between the foundations and the roof does not present many problems that should worry the ordinary carpenter, some suggestions relating to methods not commonly put into practice, but which if employed would improve matters, may be of interest, more especially to the younger members of the craft located in the smaller country towns.

Since the use of concrete became so general for foundations, and lumber has increased in price, the practice of using large timbers for sills has fallen largely into disuse and built-up sills are taking their place. In Figs. 1 and 3 are shown two methods of forming such sills which will be found satisfactory if the foundation walls are carefully leveled. Fig. 1 also shows the best method of building up corner posts that I have seen used. It gives strength and ample nailing space to each side.

If the floor lining is laid and partition sills run for both walls and interior partitions, as shown in Figs. 1 and 2, and a 2-in. (wide) ground put on next the floor lining it will make it a discouraging business for rats and mice to get through into the wall spaces, as well as help in making a good job of putting down the base. Of course, the floor lining should be laid diagonally, which will prevent its shrinkage from making a bad job of the finish floor, especially if hardwood or parquetry is used for finish. Incidentally I have found 6d casing nails do as well as heavier ones for nailing the finish floor.

Where the walls are sheathed diagonally, as should be done wherever lap siding (clapboards) are to be used, I find the angle 8 x 12 handier and easier to work than an angle of 45 deg. The plumb cuts are easier to make and the extreme ends of the square give the angle without looking for figures. Also there is not so much loose upper ends of the sheathing to contend with.

Most headers and trimmers in ordinary houses are put together with spikes, but sometimes a stronger construction is desired where it is not necessary to use girders. The general practice, in the larger towns at least, now is in such cases to use steel hangers, but sometimes these are not readily procured, and, anyway, I am old-fashioned enough to prefer the older and time-tested framing methods. Three methods are shown at *A*, *B* and *C* in Fig. 1, of which *A* is the best, as it gives the largest proportion of strength in both header and joist with the least weakening by cutting, while the other two ways are not to be recommended, though I have seen both used by men who considered themselves superior workmen and designers.

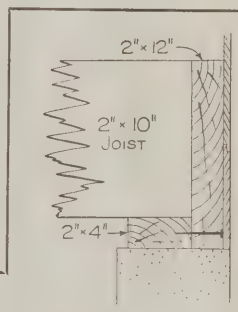


Fig. 3 — Another Method of Framing Sill of the Built-up Type

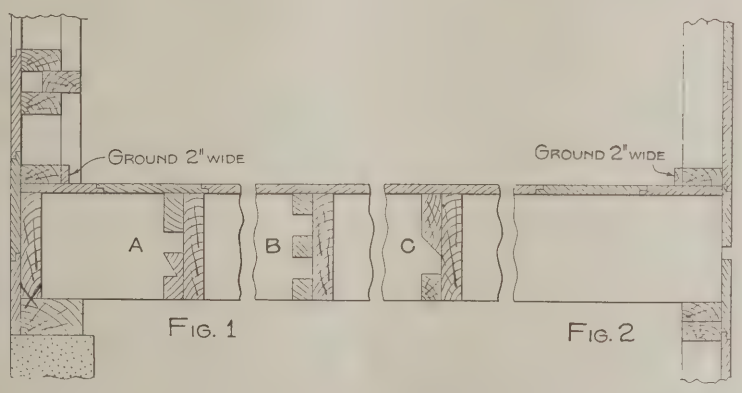


Fig. 1—Method of Framing Sill, Also Headers and Trimmers, and Building Up Corner Post

Fig. 2—Showing a Good Method of Rat-proof Construction

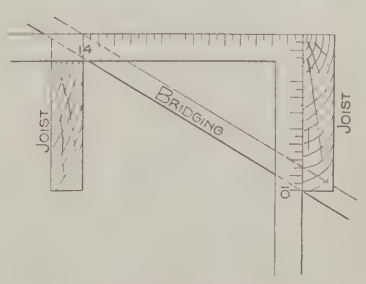


Fig. 4—A Method of Laying Out Bridging with the Carpenter's Steel Square

Some "Wrinkles" in House Building as Described by the Author

The usual practice here is to stud walls and partitions solid and cut out door and window openings afterward, and I suppose most carpenters are familiar with the rule for cutting door openings—3 in. wider and higher than the door size, that is 2 ft. 11 in. x 6 ft. 11 in. for a 2-8 x 6-8 door; but I think few carpenters have any rule for cutting window openings, probably because windows were so

much longer in becoming standardized. It used to be necessary to procure a list of sizes from the dealer, of whom the sash were bought before making the frames. I have several such lists, no two of which give the same sizes for sash of the same sized glass. However, except for sash required to be made to special detailed designs, regular sizes are now pretty well standardized, and an allowance of 10½ in. each way will make the right sized rough opening for windows where the sash are to be hung with weights. This rule will be found very convenient for all stock sizes and I have never seen it given or used outside of my own practice.

Where the extra cost of long studding or the judgment of the designer makes it desirable to build each story independent instead of running the studding all the way up for both stories and the construction at the second floor line is, as shown at Fig. 2, it will be advisable to make a joint in the sheathing about midway of the floor joist and leave an opening of an inch between the sheathing of the two stories to allow for the shrinkage of the joists.

Another thing that, while required by the building ordinances of some cities, is not otherwise usually done but should be, is that of cutting a row of bridging of the width of the studding midway in the height of all partitions including the walls for a fire stop to prevent a fire from finding a flue with a good draft in every wall space. A header the width of the floor joist should be cut between the joists over every bearing partition also.

I inclose a sketch, Fig. 4, showing how to lay out bridging with the steel square, which is self-explanatory.

When the frame is up and ready for the cornice and shingles the carpenter is sometimes called on to flash the openings for the down spouts, where wooden gutters are used and the tinner is not ready to put up the conductors, because this job can be done much easier and better before the shingling is done than after. The easiest and best way to do this is to get from the plumber a 1¼ or 1½-in. nipple or a short piece of pipe (2 or 3 in. long) with a thread on one end, bore a hole through the bottom of the gutter and screw the pipe in, bedding it well in white lead. This makes a solid job and one that will last as long as the gutter does. The conductor can easily be slipped up over it when the tinner gets ready to put it up. Of course all joints in wooden gutters should be well flashed with strips of sheet lead carefully bedded in paint, otherwise water will find its way in and swell them and they will leak.

While on the subject of gutters I desire to say that many carpenters, in putting on wooden gutters return the gutter against the fascia or barge board, as shown in Fig. 5. This always looks to me like poor taste on the part of the designer or lack of skill by the workman. Fig. 6 shows what I consider the proper way to put on a wooden (or any other) gutter and the proper way to finish the end. Of course, where the gable finishes with a crown molding the gutter will miter against the crown molding. The above refers to the "Bungalow" style of finishing gables where no crown molding is used.

I desire to say in conclusion that all the foregoing is primarily intended for the benefit of the carpenter who is his own designer, and for the more inexperienced men who look to their trade periodicals to post them on matters concerning which they have no opportunity to learn by observation.

Perhaps some of the readers will express their views on various phases of building work so that there may be a comparison of methods as they obtain in different sections of the country. It might result in a most interesting and valuable discussion.

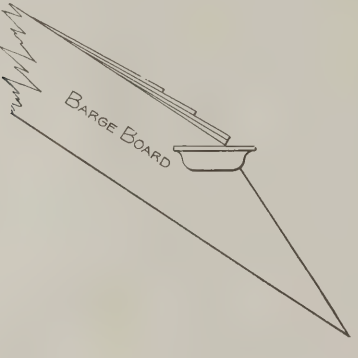


Fig. 5—Showing How Some Mechanics "Return" the Gutter Against the Barge Board

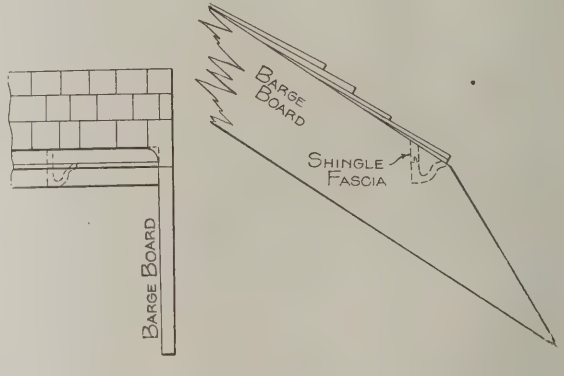


Fig. 6—What the Author Regards as the Proper Way to Put on a Wooden Gutter

Some "Wrinkles" in House Building—By G. L. McMurphy

Coming Convention of Brick Manufacturers

The National Brick Manufacturers' Association has voted to hold its next annual convention in the city of Cleveland during the week beginning Monday, Feb. 21, 1916, at the Hotel Statler. The convention will occur at the time the Complete Building Show is in progress, as this occurs in Cleveland Feb. 16 to 26. We understand that had it not been for the Complete Building Show, the brick manufacturers would probably have held their convention in Atlantic City, but those interested in the Cleveland Exposition made a thorough campaign in the interests of that city and endeavored to convince the brick manufacturers that a real opportunity to place their material before a vast building public was offered at the Complete Building Show.

Other conventions that will hold their meetings in Cleveland during the period named include the National Builders' Supply Association and the Ohio Builders' Supply Association.

Need of Accurately Estimating Costs

The Ability to Correctly Estimate Is the Dividing Line Between the Journeyman and the Master Builder

ESTIMATING building construction costs is very largely a mathematical process, but successful estimating often depends upon whether the estimate is made up in a mechanical or in a conscientious way. It requires, in the first place, an analytical mind. In the second place, it demands resourcefulness, while in the third place it calls for a thorough knowledge of a dollar's buying power in the labor and material markets.

Ability to Estimate Is the Dividing Line Between the Journeyman and the Master Builder

It has been said that the ability to estimate is the dividing line between the journeyman and the master builder. It requires more than mere accuracy and deftness in figuring. Experience and judgment are absolutely essential, a working knowledge of building construction, various materials, their market values, and the discounts allowed in the trade is vital. Then he must know how to apply them to the peculiar conditions which surround the operation he is working on. But prices and discounts are constantly changing, and cost of labor is higher to-day than at any time in the history of construction, and even construction methods are not proof against revision and reform. Building laws must conform to this progression, and what was lawful last year may, by ordinance, be entirely unlawful this year, says a writer in a recent issue of *Construction News*. These are only a few of many departments with which the estimator must keep abreast, because each change in practice or improvement in material or methods, has a tremendous bearing upon the ultimate price of the operation, and frequently, in this age of speculation, upon the final decision of the owner as to whether he will go ahead with his plans or postpone.

In Touch with Market Conditions

It therefore is apparent that the estimator must keep in constant touch with market conditions. To do this he must depend largely upon his own queries for figures and discounts, but the only way in which he can know that he is getting all the discount he is entitled to is by consulting market reports and by noting the trend of buying or selling in the wholesale market and the conditions governing the sources of supply and shipment. Despite anti-trust and anti-monopolistic laws the tendency of the times is to standardize building materials of all kinds, and as soon as these are standardized prices naturally will be on a more or less fixed or stable level. The prices for many building materials to-day seldom, if ever, change, but the discounts on them fluctuate widely and sometimes suddenly. Glass and hardware are notable examples of this kind of price changing. Other materials, such as lumber, cement, common brick, sand, steel, gravel, crushed stone and cinders are subject to the primary law of supply and demand, and their prices are liable to change without warning. There are other materials, such as front brick, stone, marble and roofing material which seldom report a fluctuation, and there are still other materials, like architectural terra cotta, upon which there is no fixed price, a special figure being given by the manufacturers according to the intricacy of the design.

Because of this wide variation in prices some estimators figure their whole proposition out on a time basis, estimating materials in quantities and keep a cost data system in their offices upon which they can rely when information of this sort is sought at some future time. This is done whether the bids were successful or not. They afford an opportunity to compare the estimates of cost of the different items with the actual cost of execution, and if a bid fails to win the job, satisfaction and experience may be gained by noting the items which may have been priced too high or too low. Another source of information is the catalogue. If these are properly indexed for ready reference they will be found of great value for specific information. For close estimating bottom prices and full discounts are necessary, so that the estimator here consults the prices quoted by the salesmen direct, guided the while by the current market reports in his specialty publication carrying this kind of service.

Practice Among Small Contractors

It is the practice among small contractors to add a lump sum to the total costs, the size of which depends entirely upon the activity of competition and the circumstances of the operator. If the payments are to be arranged on advantageous installments, so that the bidder can take advantage of the time discounts allowed on all work, he makes his profit a little lower. If long payments (hence heavy interest charges) are specified, then his profit appropriation is apt to be big. Some estimators base their profits upon a percentage of the estimated cost. This varies in ordinary cases from 10 to 20 per cent., according to the caliber of workmanship stipulated and the selection of materials and the expense of handling it. Therefore, locality counts for much in the high or low cost of the work.

Figuring on duplication is an important item, especially if the work is of the suburban residential type, where one building will be duplicated many times. A considerable saving is then possible, because certain kinds of material are purchasable in large quantities, either worked or unworked. This is especially true in manufactured parts, such as doors, windows, columns, balustrades, trim and flooring. The distance of the work from the material distribution center has much to do with the profit, although when materials can be taken direct

from the car to job on a special order, the cost is materially reduced, because then the material has only one handling and the extent of damage or waste is greatly reduced. Many contractors keep on file data of haulage costs from different sites on which they have figured for reference, and in this way they sometimes are able to underbid their competitors on this item alone. The most convenient and reliable of these systems is known as "cubing." It is a system of taking the cubical contents of a building and fixing a price upon it. The rate is obtained by a comparison of plans and requirements with similar buildings which have been erected under conditions as near like those of the job in hand as it is possible to find them.

Determining Cubical Costs

There are several methods of determining cubical costs, however. One method is to multiply the square feet in the plan of the building by the hight from half the depth of the foundation to half the distance to the roof. Another system uses the hight from the bottom of the foundation and another obtains the actual cubical contents. Any of these may be used if the data for comparison is obtained in the same way, but all are subject to important variations which experience and judgment alone will determine. For instance, if the contour of the building is very uneven, with low portions, such as porches and sheds and high portions, such as towers and cupolas, these must either be omitted from the whole and compared separately or a lump sum be added or subtracted according to the size and importance of the members.

Estimating by "Cubing" Is Only Approximate

Another variation arises in the sizes of the rooms, giving a ratio of partitions and division walls which is not constant, and, of course, a large building with many duplicate parts will require a different rating from a small one, so that the method of estimating by cubing is at best approximate, and its degree of accuracy depends largely upon the experience and judgment of the contractor. Even long experience will afford no safeguard against unusual feature of the interior, so that the cube rates can only be applied to buildings of ordinary character, and comparisons are only reliable between buildings of like descriptions and uses, as the treatment of even the same materials will vary largely in buildings of varying uses. The hight of a building will not increase the cube rate proportionately, unless the internal voids are alike, although it is certain that the higher one builds from the ground the more time and expense it requires to put the material in place, to say nothing of thicker walls or heavier steel and more expensive equipment, especially in elevators.

Estimating by the Square

A convenient method of estimating is by the square of 100 surface feet. This is especially applicable to office buildings, schools, mills, stables, garages and all buildings where the floors are few in number or similar in plan. For one-story buildings the price per square is taken to include the roof walls, floor and foundations, but for buildings of two or more stories the price per square should be taken separately for each floor, the lower floors being prices to include the foundations and the top to include the roof.

This method of estimating by the square is not so accurate as by cubical contents, but the results are often more convenient and adoptable, because the tabulation of the square area of the various floors may be easily reduced to terms of accommodation for public buildings or shops. For instance, a given floor area in a schoolhouse means accommodation for a certain number of pupils; in a church for a certain number of sittings; in factories for the manufacture of staple goods a certain number of machines and operatives. This unit of accommodation is sometimes carried farther, and, by the reverse process, is made the basis of another method of estimating the approximate cost of such buildings—i. e., schools, churches, factories, hospitals, mills, etc. This also is used as a method of comparison, the known data being supplied by previous experience or by calculation, and it is often valuable as a means of determining the approximate cost of buildings necessary to accommodate a certain number of individuals or machines, even before any definite plans have been drawn.

All of these methods are approximate, with varying degrees of accuracy. But before using this system as a basis for a contract figure, a sum, governed by the judgment of the estimator of the actual operation, should be added to the total of the original estimate to allow for any possible shortage.

Commercial Importance of the Builders' Exchanges

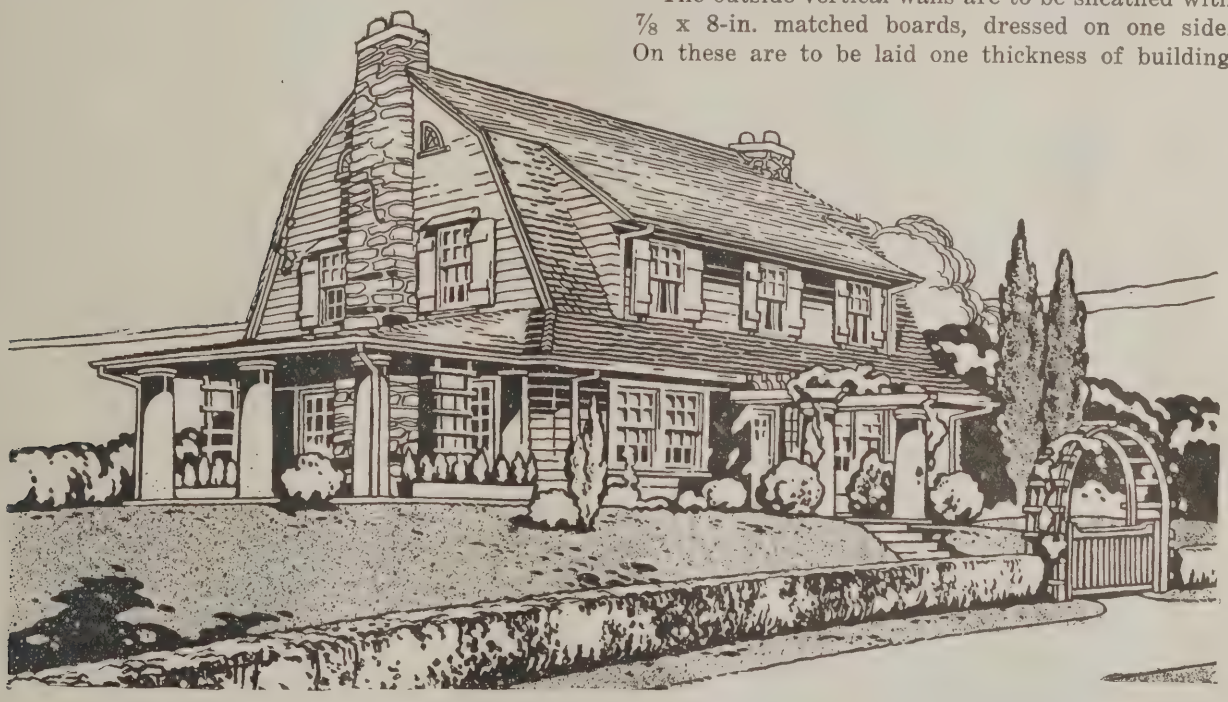
The importance of the Builders' Exchange to the community, in its dual capacity of regulator of estimates, and correct dealing, and its position as the clearing-house for the vast amounts of capital the investor yearly expends in building materials and construction, is hardly recognized at its full value, says a recent issue of the *Western Architect.* Here is an association of identical interests in which the keenest rivalry exists; a "combine," if you please, in which the basic principle is competition, and thus sets aside all the rules of the game that impose upon the public by close corporation methods as they are popularly known. Any man or firm engaged in handling construction contracts, or dealing in materials in a legitimate manner, is welcomed to the Builders' Exchange; ability, honesty and integrity being the only necessary recommendation. Where it has been charged that the Exchange refused admission to the small contractor, it has been found that it was the irresponsible, and therefore detrimental, both to the general contracting interests and to the public, that was barred from membership.

Often misunderstood by labor in its opposition to the "closed shop" principle, its endeavor has been, not to reduce but to equalize and make more stable the wage for efficient performance, both in the interest of the contractor and the wage-earner. In its activities for the betterment of labor conditions, upon which much of success in contracting rests, the Exchange advocates the establishment and maintenance of practical trade schools.

A Seven-Room Dutch Colonial House

A Compact Arrangement with the Living Room a Notable Feature—A Few Details of Construction

IN response to numerous inquiries for the plans, elevations and miscellaneous constructive details of a Dutch colonial dwelling containing seven rooms and bath, we present herewith an interesting example of domestic architecture designed to meet the requirements named. An inspection of the floor plans shows the living room to be one of the noticeable features, this extending the full depth at one end of the house, and having as its central feature an open fireplace with mantel of tapestry brick flanked on either side with French casement doors which give out upon an open porch of cement finish. The main stairs are centrally located and the landing is lighted by a window in the second story of the rear wall. The stairs to the cellar are directly beneath the main flight and are readily accessible from the kitchen pantry. Entrance through this to the kitchen is from a rear porch, the door of which is in line with the cellar stairs. At the right of the hall is the dining room and beyond this the kitchen, provided with ample cupboards, and with the sink placed directly beneath the window at the rear.



Perspective View of a Seven-Room Dutch Colonial House—Architect, Frank T. Fellner

On the second floor are four sleeping rooms, each provided with wardrobes or closets and with the bath room conveniently accessible from all sleeping rooms.

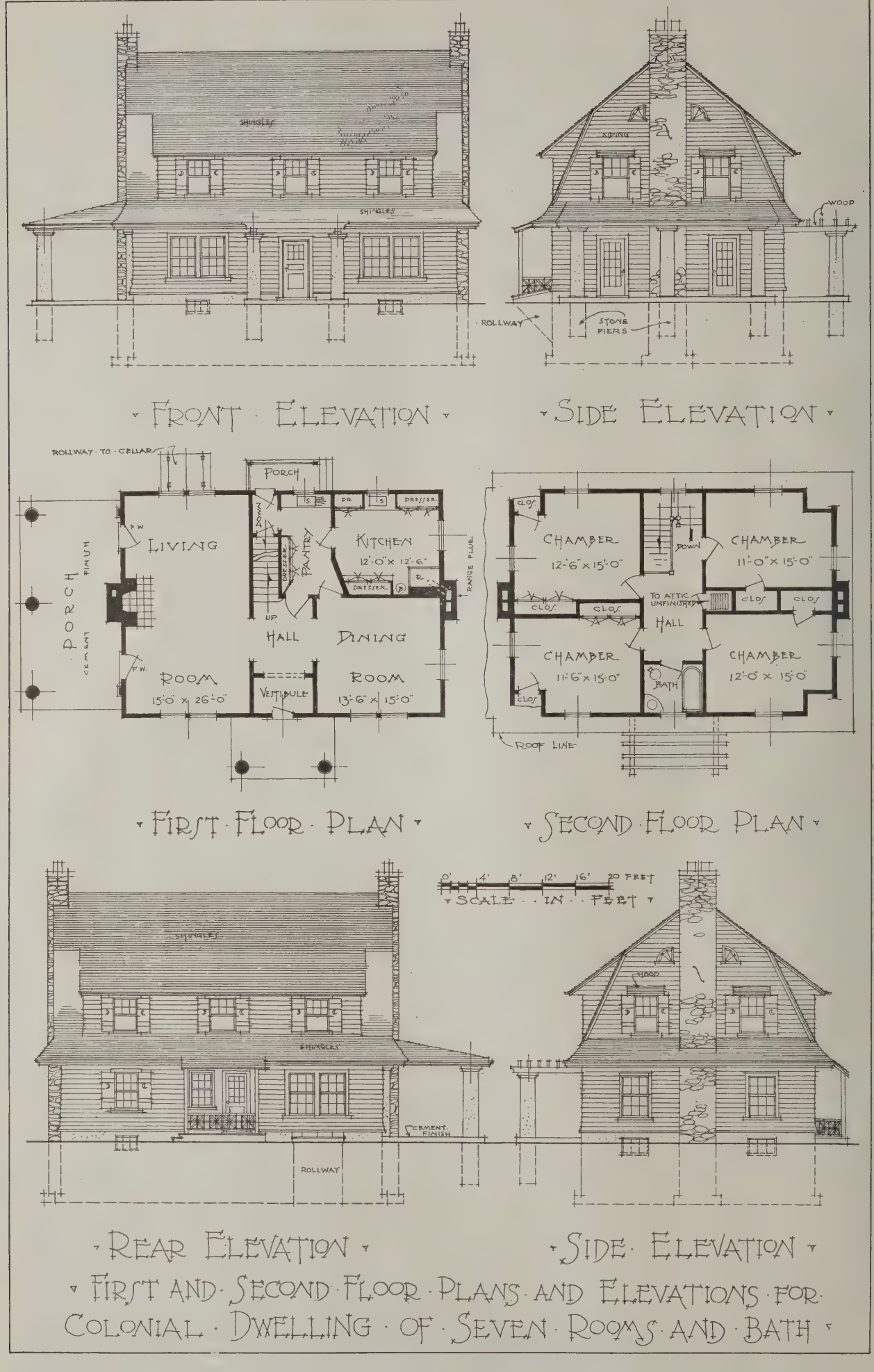
The chimneys at each end of the building are to be constructed of field stone laid up in white cement mortar with struck joints and finished with blue stone caps 5 in. thick and topped with round flue tile projecting 10 in. above the cap stones.

The foundation walls are to be of concrete 12 in. thick, or of field stone 20 in. thick, resting on footings of stone or concrete not less than 10 in. thick, and projecting at least 6 in. beyond the walls on both sides. The timbering is to be of spruce or hemlock with sills 4 x 6 in., laid flat; girders of 6 x 8-in. spruce; first floor beams of 2 x 10 in. and the second floor beams of 2 x 8-in. long leaf southern pine, all placed 16 in. on centers; the rafters 2 x 8 in. placed 20 in. on centers and the ridges 10 x 1¼ in. The beams are to be doubled for all headers and trimmers, around chimneys, etc., and to be hung in stirrup irons.

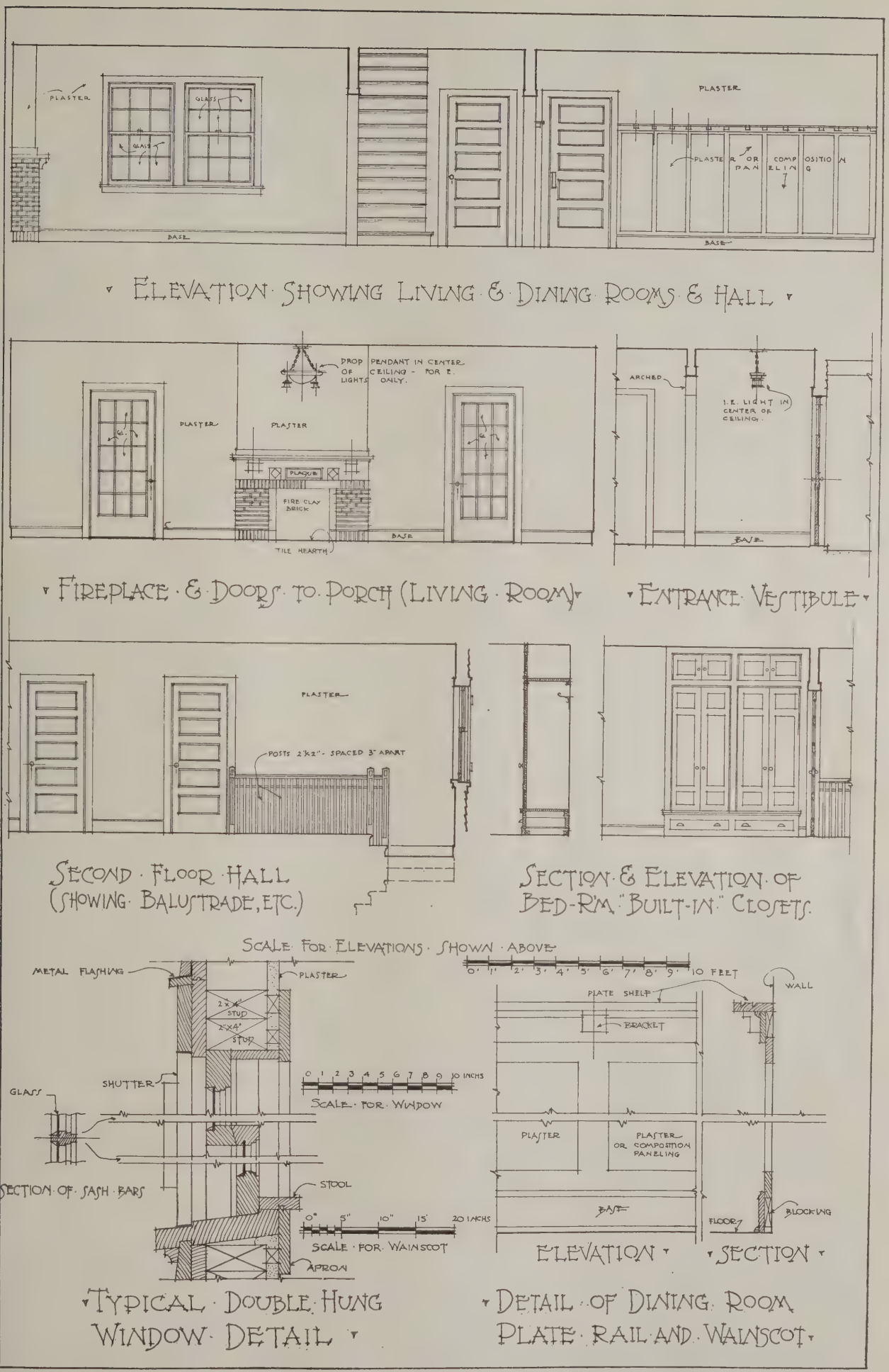
The outside vertical walls are to be sheathed with ⅞ x 8-in. matched boards, dressed on one side. On these are to be laid one thickness of building paper well lapped and this in turn covered with clapboards.

The roof is to be covered with asbestos, asphalt or wooden shingles, according to the preference of the owner. If wooden shingles are used they are to be laid with an exposure of 5½ in. to the weather.

The cellar in the clear is to be 7 ft. 4 in. and is to contain the laundry which will be provided with two tubs and a water heater. The first story rooms are to have double floors, the finish floor to be ⅞ x 2½-in. tongued and grooved best quality maple, blind nailed. All interior trim, base, balustrade on the second story, clothes dressers, etc., are to be of plain design and of thoroughly seasoned and kiln dried white pine or cypress. The main cornice, etc., is to be formed with plain fascia and simple cornice moldings and soffit. Hoods are



Plans and Elevations of the Seven-Room Dutch Colonial House Described on the Previous Page



Miscellaneous Constructive Details of a Seven-Room Dutch Colonial House—Architect, F. T. Fellner

to be placed over the second story windows on the sides, as shown in the elevations.

The rooms are to be plastered with three-coat work, the living room, dining room and hall to have a sand finish and the other rooms a hard white finish.

The floor on the bath room in the second story is to be laid with white tile on a cement bed, with tile base and cove. The wainscoting is to be of tile, extending up from the floor a distance of 5 ft. and finish with a neat cap.

The heating is to be by hot water system, the exposed pipes in the cellar to be covered with asbestos packing. All rooms and the hall, except pantry and kitchen, are to have radiators located where possible under the windows or at least in close proximity to them.

The house is to be piped for gas and wired for electric fixtures, the latter to be of the combination type. The fixtures for the dining room and living room are to be drop pendants—a five-light drop for the living room and four-light for the dining room—with wall brackets for the bed rooms. The hardware is to be of colonial design, black iron finish.

The plumbing fixtures are to be porcelain of modern design and with nickelplated fittings. The building is to be drained to the street sewer or to a cesspool in the rear in case no sewer is provided in the street.

The outside wood and metal surfaces are to receive three coats of paint and the roof shingles, if of wood, are to be dipped in stain before laying. All inside woodwork on the first and second floors is to receive three coats of paint.

The architect gives the approximate cubic content of the house as 34,590 and the unit cost 19c. a cu. ft. He states that this estimate does not include contractor's profit "nor does it cover any particular locality or section of the country in which the house may be erected."

The design here shown was prepared and specifications furnished by Frank T. Fellner, architect, 413 Caton Avenue, Brooklyn, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Standard Rules for Measuring Plaster

A Chapter Taken from the Handbook Issued Under the Auspices of the Illinois Society of Architects



THE following are the standard rules covering the measurement of plastering as adopted by the Employing Plasterers' Association of the city of Chicago, and may be of interest to the trade in other parts of the country.

Lath and plastering to be measured by the superficial yard, from floor to ceiling for walls, and from wall to wall for ceiling.

In rooms containing one or more horizontal angles between the floor and ceiling line, the ceiling to be measured from wall to wall, as though all walls were vertical, for contents of ceiling, and from floor to highest point of ceiling for height of wall.

Openings

Openings in plastering to be measured between grounds. No deductions to be made for openings of 2 ft. or less in width. One-half of contents to be deducted for openings 2 ft. or more in width. The contents on all store front openings to be deducted, and the contractor to be allowed 1 ft. 6 in. for each jamb by the height.

All beams or girders projecting below ceiling line to have 1 ft. in width by total length added for each internal and external angle.

No openings to be deducted from "solid" or "hollow" metal lath and plaster partitions nor for openings in suspended ceilings containing less than 100 sq. ft., where furring is carried around such openings by plasterer. No openings to be deducted from cement wainscot or base.

Corner Beads, Arches, Etc.

All corner angles of more or less than 90 deg., beads, "bullnoses," quirks, rule joints and moldings, to be measured by the lineal foot on their longest extension, and 1 ft. for each stop or miter.

Cornices

Length of cornices to be measured on walls. Plain cornices of 1-ft. girth or less to be measured on walls by the lineal foot. Plain cornices exceeding 1-ft. girth to be measured by the superficial foot. Add one lineal foot to girth for each stop or miter. Enriched cornices (cast work) by the lineal foot for each enrichment.

Arches, corbels, brackets, rings, center pieces, pilasters, columns, capitals, bases, rosettes, bosses, pendants, and niches, by the piece. Ceiling or frieze plates over 8 in. wide by the square foot.

Columns

All columns to be measured by the lineal foot for plain plastered columns.

Cement Wainscoting and Base

All cement wainscot to be measured by the square foot, and cement base by the lineal foot.

Grounds

All grounds for various classes of work to be as follows, unless expressly specified to the contrary.

Grounds for 2-coat lath work..... ⅞ in.
Grounds for 3-coat lath work..... 1 in.

Grounds for 3-coat metal lath work..... ⅝ in.
Grounds for 3-coat metal lath work, on ½-in. iron furring .....1⅛ in.
Grounds for 3-coat metal lath work, on 1-in. iron furring .....1⅝ in.
Grounds for hard mortar metal lath work..... ⅝ in.
Grounds for hard mortar metal lath work, on ½-in. iron furring.....1⅛ in.
Grounds for 2-coat work on brick or tile..... ⅝ in.
Grounds for hard mortar on brick or tile..... ⅝ in.
Grounds for hard mortar lath work..... ⅞ in.
Grounds for plaster board..... ⅞ in.

Where metal lath is spoken of it applies to all wire or metal lath.

Jurisdiction Claims

By Plasterers' Union, any and all plastering, regardless of the nature of the material or of the structure to which it is applied. By Lathers' Union, any and all lathing, metal corner beads, all light iron furring designed, specified or used primarily as a support for lath and plaster.

Patching of plastering after other mechanics shall not be done as a part of the contract price and shall be paid for at the following scale of prices, which are in accordance with present wage agreements:

Plasterers .....90c. per hr.
Lathers .....90c. per hr.
Laborers .....60c. per hr.
Mortar .....$1.50 per bbl.
Putty .....$2.00 per bbl.
Stucco .....70c. per cwt. jute sack
Cement .....70c. per cwt. jute sack
18-gage ⅜-in. mesh painted wire lath or 24-gage metal lath painted.....25c. per yd.
1½-in. pine lath.....35c. per bunch

Practical Manual Training in St. Paul

Type of Work Bench Designed Especially for the Purpose—What The Builders' Exchange Has Done

WE take the following relating to the above subject from the last issue of the "Monthly Letter" of The Builders' Exchange of St. Paul, Minn.:

Manual training applied to practical use brought highly satisfactory results in a demonstration made in the public summer schools in St. Paul during the past season. The Department of Education of this city required 150 work benches for the manual training classes of the grade schools. The fund available for the purchase of the equipment was found to be insufficient. The Supervisor of Manual Training of the St. Paul schools, D. V. Ferguson, a practical mechanic, as well as a highly skilled instructor, was determined to have a complete equipment for the fall term of school. He therefore made a proposition to the Department of Education to build the required benches and have same ready on time and to keep the cost within the fund available. His plan involved the use of the shops in one of the high schools. His force to be made up of four instructors from the Manual Training Department of the schools, to be selected by him because of their practical knowledge of the work. The crew was to be made up of students attending the Manual Training Department of the summer schools. Mr. Ferguson's proposition was accepted by the department, and when the summer school opened he went to work.

One of the things which Mr. Ferguson resolved to do was to build the benches on the plan of his own design, with a drawing board and seat attachment as shown in the accompanying picture. This bench is known as the "Ferguson Special."

Mr. Ferguson, in speaking of his assistants and the system by which the work was done, has this to say: "Perhaps one of the greatest secrets of the success of the enterprise was the fact that I was permitted to have practical shop men (instructors in the city schools) who knew the commercial as well as the teaching side of the work for instructors."

The school opened with an enrollment of twenty-five boys, seven entering later. The average attendance during the term was twenty-seven. The total number of hours worked was 120. The benches were completed on time, the cost of each being $8.61, which included material, power, salaries of instructors, etc. The commercial price of a bench lacking the improvements of the "Ferguson Special" would have been $14. This practical instructor not only had 150 benches ready to install in his department on the opening of schools at a considerable saving in price to the city, but also had the satisfaction of making a successful practical demonstration in the use of the Manual Training Department of the public schools, which has attracted the attention of



Style of Manual Training Bench Used in the St. Paul Schools

school authorities in a large number of the cities of the country.

The Builders' Exchange of St. Paul has been instrumental in bringing about conditions which made the above demonstration possible. Years ago Manual Training was looked upon as a fad in the public schools. Few of the instructors were men with practical knowledge of the subject they were teaching. When we first interested ourselves in the work, the instruction was such as any boy could give himself. The necessary rudiments of mechanics were lacking. No attempt had been made to instruct the boys how to sharpen or correctly use the tools with which they were to work. This has all been changed now. Practical men have been put in charge of Manual Training and the courses are of a practical character; while trades are not learned in the schools the instruction received is of a kind that lays the proper foundation for entering a trade if a student desires.

Sand Foundations for High Buildings

Sand, being almost incompressible under ordinary conditions, can sustain very heavy loads with slight or negligible compression. When it directly overlays rock or other thick, hard stratum and is securely confined or otherwise protected against possibility of lateral displacement it forms a satisfactory foundation and will carry heavy loads with safety as long as these conditions are maintained, says the *Engineering Record.* It transmits pressure laterally so that a heavy vertical load may produce considerable horizontal thrust and to resist it the sand must be confined horizontally by natural or artificial means. At considerable depths below the surface the weight of the superincumbent material affords resistance to transverse or upward pressure and is equivalent to lateral confinement for ordinary pressures. This resistance, of course, ceases whenever an excavation is made below and adjacent to the point of application of vertical pressure.

The presence of water makes a great difference in the character of the sand so that the drainage of wet sand or the saturation of dry sand under pressure is an important matter, while flowing water passing through sand, especially if fine, is very likely to carry the grains with it or produce a considerable movement.

Careful consideration must, therefore, be given to these factors when it is proposed to build heavy structures on sand foundations. If any changes in the amount of water in the sand are possible adequate safeguards to maintain the conditions must be adopted.

Many heavy buildings of moderate height, including some of the earlier steel cage skyscrapers, have foundations on sand, usually only a few feet below the surface, and these foundations in many instances have proved entirely reliable. Almost all of them are at or above ground water level. Formerly they were made with timber and masonry footings, then of concrete and now almost entirely of reinforced concrete or of steel beams enclosed in concrete.

Some buildings have a monolithic foundation slab covering the entire area. While theoretically this distributes the load uniformly and produces the smallest unit pressure, it is generally very difficult and expensive to avoid excessive stresses in the distribution, and some such footings, especially those of concrete without adequate reinforcement, have become badly cracked and broken and have permitted serious settlement. It is, therefore, the general practice now to support the columns singly or in small groups on isolated separate footings proportioned to reduce the loads to substantially the same unit pressure on all.

The Spreckels Building, San Francisco, fifteen stories high, was built about fifteen years ago with all of its columns seated on a double grillage of continuous I-beams reaching entirely across the lot in both directions and embedded in a mass of concrete more than 4½ ft. thick resting on wet sand 25 ft. below the surface of the street. This has proved satisfactory, enduring severe earthquake shocks which it was expected to resist.

The columns of the St. Paul Building, a twenty-six-story structure in New York, have steel beam and girder grillage with concrete footings on the wet sand about 30 ft. below the street. The sand was loaded to 8000 lb. per square foot and in several years has settled only a fraction of an inch and with such regularity that it has been unnecessary to adopt the special provisions designed for compensating irregular or excessive settlement.

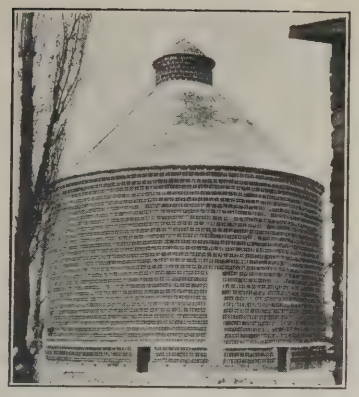
In the new Municipal Building, New York, part of the foundations are carried to solid rock and part supported on wet sand.

Building Material Exhibit in San Francisco

Arrangements have been made by a number of exhibitors of building material at the Panama-Pacific Exposition to establish a permanent exhibit when the fair is over, for the convenience of architects and prospective builders in San Francisco and vicinity. The collective exhibit will be installed on the third floor of the Newman-Magnin Building at Stockton and O'Farrell Streets, and will be under the management of L. Fisher and T. M. Simpson, who have recently made a study of such exhibits as conducted in other cities. The lines exhibited will include brick and tile, glass, marble, plumbing and electrical fixtures, building hardware, hardwood fittings, paints and varnishes, heaters and refrigerators, etc. According to the preliminary plan, a number of exhibits will be brought intact from the Exposition to the new location.

Accelerator for Hardening Concrete

Experiments have been made by the United States Bureau of Standards to develop a method for accelerating the hardening of concrete in order that the material might be utilized in place of the willow mats that have been used in the past along the Mississippi River. The Bureau finds that 4 per cent of calcium chloride added to the mixing water increases the strength of the concrete at the age of one day 100 per cent or more. In some cases the strength of the concrete in which the calcium chloride was used at the age of two days equaled 75 per cent or more of the strength normally attained in one month.



A Sanitary Corn Crib —For The— Up-to-Date Farmer

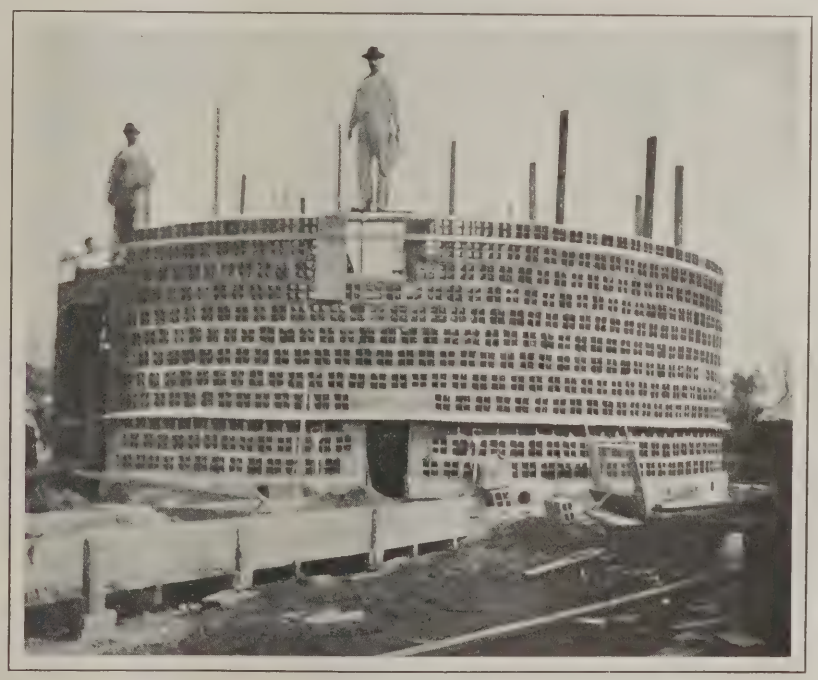
A Necessary Adjunct of the Farm That Is Unique in Its Construction and Is Both Fireproof and Ratproof

By W. E. Frudden

THE day of better corn cribs is at hand, for corn that is worth 50 to 60 cents per bushel needs to be cured and cared for in a proper manner, and this fact is being appreciated by the progressive farmer. Rats that spread plague and disease as well as eat up the profits of the farmer are dangerous. The present-day crib construction immunes the cribbed corn from the invasion of mold or rot and assures the owner that every kernel will be turned into money. Farm efficiency is cutting wide swaths in twentieth century agriculture.

In the pictures and detail drawings here presented there is told the story of how one Iowa company built a 10,000 - bushel round crib that is fit for high-priced corn. It was constructed of hollow clay blocks with the open ends out and set at an angle so that the rain could not reach the cribbed corn. Its construction is such that it lessens the work of cribbing since a small elevator in the center ventilating core, operated by a small oil engine, hoists the corn to the crib from the wagon dumps. It cures the corn properly and stores it with safety. It is a type of corn crib that corn belt farmers can well afford to build. This method of crib construction can be carried out to advantage in any size or capacity of crib. It is adaptable to the needs of the small quarter-section farmer as well as of the big farm that covers a section or more of land. It is a crib that if made in large sizes fits well the needs of the small or large elevators over the country.

Thirty by thirty-two feet is the size of the crib shown in the details, and which gives promise to become exceedingly popular in the corn States. Round cribs need less material and have more strength than rectangular cribs of the same capacity. When the method of building becomes more generally known by builders, this type of crib will come to its own. Circular walls are easiest built of blocks, and when safely reinforced in the mortar joints by ¼-in. wires, the resulting wall is a permanent and serviceable improvement.



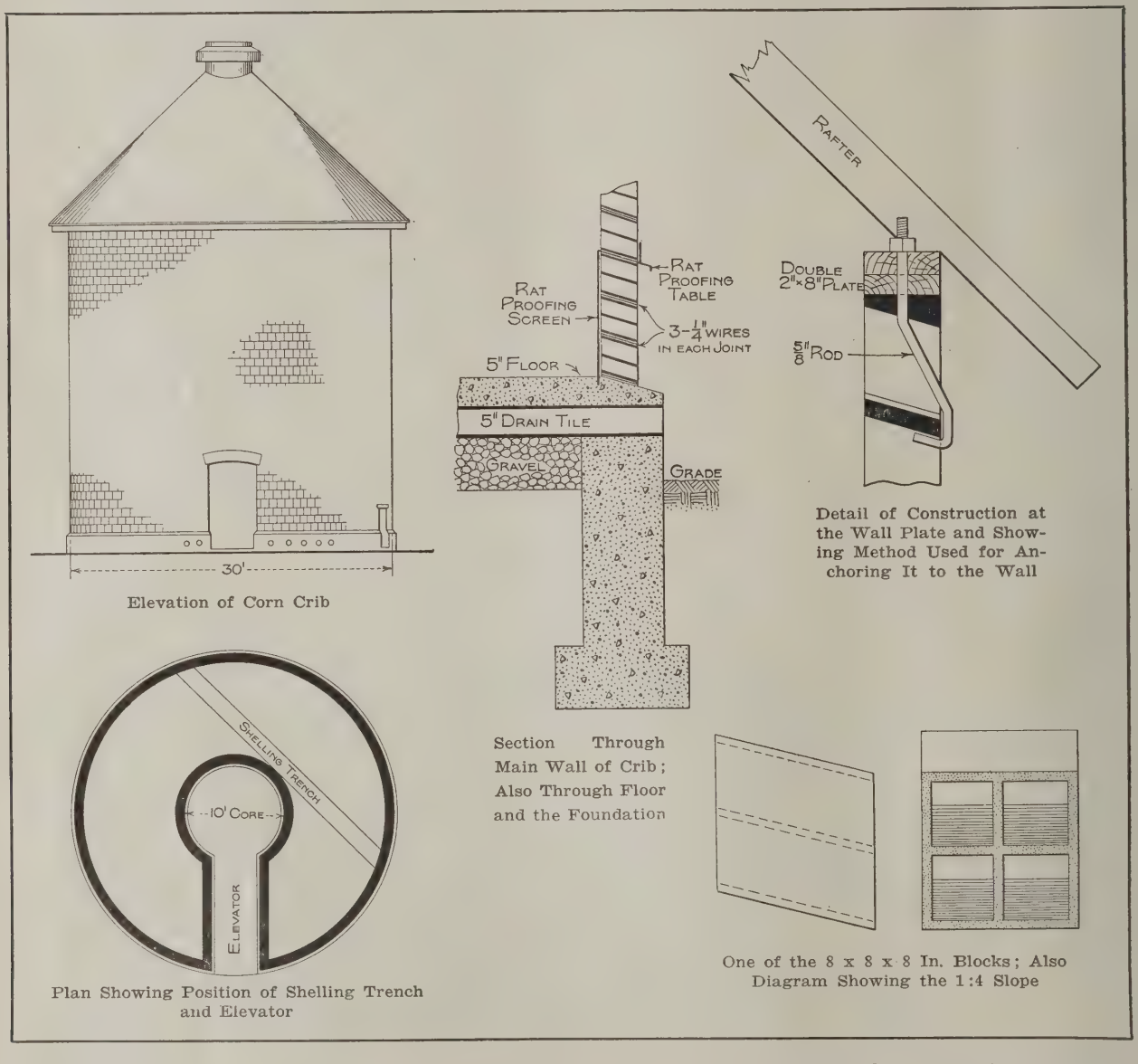
The Corn Crib in Process of Erection and Showing Appearance of the Hollow-Tile Wall with the Rat-proof Table

For the foundation of cribs of this sort footings 2 ft. wide are necessary. This is 8 in. thick and goes down about 3 ft. below the grade line to insure safety from frost. A 16-in. or 18-in. foundation wall of concrete will support the building. Use a 1:5 or a 1:4 mixture for this work. The foundation for the center 10-ft. ventilating core will be of just the same dimensions as for the outside walls.

In laying the foundation wall above grade, the 5-in. drain tile must be imbedded into the concrete. These are for drainage and also as an air space under the floor. Crib floor construction of concrete has had many enemies in the past due to the

fact that it causes moldy corn. Concrete floors must be built to be dry. Good results will be secured if one follows out the details as shown in the cross section of the walls. Keep the concrete from coming in direct contact with the soil and soil moisture. Cover the entire space with 6 in. or 8 in. of coarse gravel before laying the 5-in. thick floor. The drain tile are set in first before the floor is laid and placed about 4 or 5 feet apart and run through to the ventilating core. Shelling trenches in the floor, 18 in. wide and 18 in. deep, are built in to make easy the job of shelling corn. An endless belt runs through the trench and carries

The walls of the crib are 8 in. thick. The blocks made especially for the purpose are set at a slope of one to four, as shown in the diagram. The blocks are 8 x 8 x 8 in. in size. Each has four air cells. Since they are not square cut, they will make a smooth outside and inside wall and will at all times keep out the rain and moisture. It is necessary that the walls be smooth and perpendicular, or the corn will lodge and bridge across, throwing an unusual strain on the walls. No. 2 and No. 3 corn has been shelled out of these cribs when in the same community other cribs have been a source of nothing but moldy corn. Ventilating cribs are a



A Sanitary Corn Crib for the Up-to-date Farmer—Some Miscellaneous Details of the Construction

out the ear corn to the sheller. Short pieces of plank are laid over the trench when being filled. It is estimated that from ½ to ¾ cents per bushel of shelling costs can be saved by using a crib of this kind. One man can roll the ear-corn into the trench and feed more corn than the average sheller can handle. The walls of these trenches are of concrete or could be made up from a hollow block, thereby eliminating the building of the "forms." For the floor and foundation of this Iowa crib there was required about 8 yd. of gravel and 14 barrels of cement.

big problem to solve, but this tile crib seems to fill the bill in a very acceptable manner.

Every course of blocks in the wall are reinforced with thre ¼-in. black unannealed wires set in the mortar joints. To fight the hungry and troublesome rats, a rat-proofing screen covers the inside of the three lower blocks, while a galvanized rat-proofing table projects out 4 in. Made of heavy material, it will not readily be bent out of shape, and if the outer edge is bent downward, horses or other stock will not be injured.

The roof is built with a double 2 x 8-in. plate

bolted to the top of the tile wall, as shown in the details. These bolts can be easily made by any blacksmith. The rafters of 2 x 6 in. are then nailed to the plate and are supported at the center by posts projecting upward from the ventilation core walls. At the lower end of the rafters near the outside walls the rafters should not be over 3 ft. apart.



A Sanitary Corn Crib for the Up-to-date Farmer—Two Examples—One Having a Capacity of 8000 Bu. and the Other 12,000 Bu.

When all the rafters have been spiked to the plates, pieces are nailed in between at intervals of 6 ft., starting at the lower end and running upward; then nail on the sheeting so as to run with the rafters. It is a good plan to curve the pieces which are nailed in between the rafters; that is, make them a little higher in the center. The resulting roof will then be perfectly smooth and will give a very pleasing appearance. One by four sheeting is commonly used with shingles of a tar and asphalt preparation or of metal. At the top of the roof is placed a large cupola or ventilator of galvanized metal. This will draw like a chimney up through the ventilating core and the result is that all the moisture is pulled out of the corn that is stored in the surrounding cribs.

The round 10,000-bushel crib here shown can be built for $2,700. This price includes the building complete with roof, the cup elevator and the gas engine and everything in readiness for operation—ready to receive the corn. The tile were purchased at the rate of $60 per 1000. This particular crib was built for a farmers' co-operative elevator company in Iowa. For the average farm, however, a much smaller crib would be needed. Many of the smaller size have been built on smaller farms with good results. A capacity of about one-quarter this size would fit well on many farms. For $700 or $800 a farmer could build a very satisfactory crib of this type and one that would last a lifetime, fight rats and mold and give him big returns for the money spent in the building of the crib. The scheme is adapted for almost any section of country and should interest many readers.

Novel Method of Handling Plaster

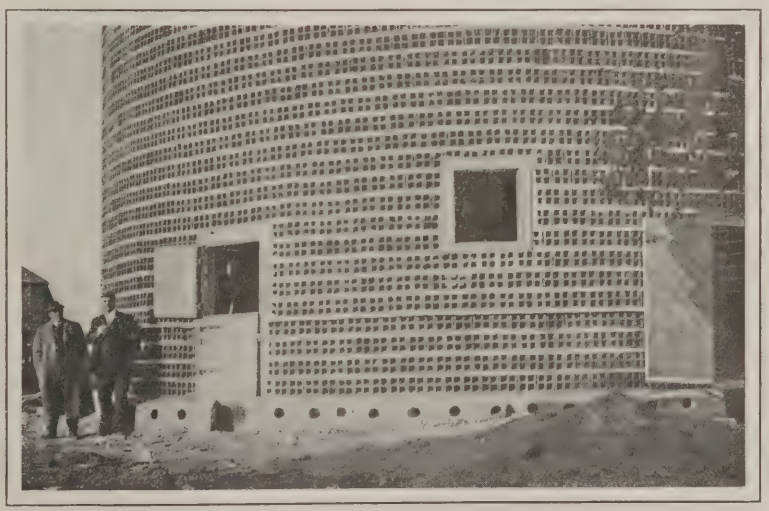
A somewhat unique method of handling plaster by means of wheelbarrows and hoists was utilized in connection with the interior finish of a reinforced concrete building in a Northwestern city. The plaster was mixed by hand and shoveled into steel wheelbarrows, which were raised to the various floors.

A steam hoist on the ground had its cable led through a boom on the tower of the concrete elevator, and a landing platform projected from the floor where the plastering was in progress. The end of the cable had a three-rope sling; one rope had a hook which engaged the wheel of the wheel-barrow, and the others had iron rings to be slipped over the handles of the barrow.

Four men were employed for doing the work. One mixed the plaster and loaded the wheelbarrows; one handled the hoist; one wheeled the barrows to and from the hoist, attached and detached the sling and held a tag line to steady the barrow and keep it clear of the building in raising and lowering, while the fourth man was on the upper floor to swing in the loaded barrow on the landing platform, unhitch the sling, wheel the barrows on the floor and attach the sling to the empty barrows.

Panama-Pacific Exposition Buildings Sold

During several weeks preceding the close of the Panama-Pacific Exposition, many of the State and special exhibit buildings were put up at auction. Notwithstanding the high architectural merit of many of the buildings, some of which were substantially built, the prices realized were very low, the buyers in nearly all cases being wrecking firms. The fine building erected by the State of Illinois at a cost of $92,000, was sold for $1,730, and the New York City building, costing $34,000, brought only $300.



View of Crib Showing Rat-Proofing Band, Shelling Trenches and Openings in the Base for the Ventilation of the Floor

The figures on some of the other buildings are as follows: Washington State, cost $45,000, sold for $800; Mississippi, cost $13,000, brought $225; Idaho, cost $16,000, brought $270; Texas, cost $10,000, brought $225; and the Iowa State Building, costing $28,000, brought $500.

The picturesque Oregon building, of massive log construction, did fairly well, selling for $1,520. A proposition has been made to move the New Jersey building across the bay on a barge, and convert it into "flats"; and local patriotic societies are endeavoring to raise funds to move the Virginia building to Lincoln Park.

The movement to preserve the Palace of Fine Arts, the most substantial of the palaces and generally considered the most beautiful, has been practically given up, as the building stands on Government land which is needed for military purposes; but there is talk of rebuilding it in Golden Gate Park. Efforts are also being made to preserve the California building, but the outcome is doubtful.

The impressive Lumbermen's Building and House of Hoo Hoo, built of characteristic logs of many kinds and ornamented largely with redwood bark, has been sold to the Peninsula Land & Improvement Company, and will be set up as a public building in the nearby town of Monte Vista.

There is some probability that the removal in the near future of most, if not all, of the main exhibit palaces may glut the local market with large dimension timber, which is the main material used in their construction, and which was bolted together in such a way as to cause comparatively little injury to the material. On the other hand, the large quantity of bolts, rods and bars used in these buildings should find a good market, if they can be removed within the next few months, as deliveries of new material are badly delayed and the supply light.

Convention of Builders' Exchanges

The Coming Meeting to Be Held in Baltimore in February Looms Large in Importance

AS the time approaches for the National Convention of the Builders' Associations of the country, to be held at Baltimore, Md., Feb. 22, 23 and 24, 1916, the building fraternity is impressed with the strong probability that these deliberations will be looked back upon as marking an important turning point in the method of conducting the building operations of the country.

We find the leading architects advocating contract reform with full arbitration for all questions, the builders strenuously working to attain the same end, and many leading real estate journals that support and protect the owners' interests insisting upon their universal use, for building improvement.

It certainly is a striking situation that a reform which the builders conceived and inaugurated less than three years ago, in order to better building conditions, should now be so fully approved and earnestly supported by leading architects, owners and in fact by all interests concerned. It emphasizes the point that their policies possessed merit, and that this reform must have been conducted upon intelligent, diplomatic and firm lines.

It is rather unusual for all interested parties, especially when at times in direct opposition to each other, to have been so harmonious in eradicating obsolete methods, and acting as a unit. It is an indication that the builders' ideas and policies were well founded, and best for all concerned.

The Baltimore convention will assemble under these conditions with its members having a feeling of pride in their past accomplishments and a confidence in the future that will be an extremely important factor in guiding their deliberations, and insuring the successful execution of their conclusions.

The realization of the many needs for improvement, and the cure of unbusinesslike methods current in the builder's vocation is apparent, and has created a deep impression, resulting in everyone fully appreciating his manifest duty for action to be taken upon these questions for their rapid and permanent cure.

Never before has a convention assembled where the necessity for advancement, improvement, and obligations to the owner as well as to the public, were so apparent, so fully realized, or have had such a wide study and preparation for their solution. Out of such thoughts are bound to grow important policies. Practically every building organization of note, whether a member of the National Association or not, will be represented at the Baltimore convention, and the representatives will come fully prepared intelligently to consider these important matters, and formulate plans to place the building business on the same commercial plane as other important branches of commerce and industry. To attain this end, the architects and builders are fully co-operating in a sincere and friendly manner.

Their just settlement under these conditions may be regarded as a foregone conclusion, as it means a new era of businesslike procedure in the conduct of building—a day to be welcomed by the architects and builders, also by the owner and all building interests subservient to his investment.

Registration of Architects in Ohio

After spending a year preparing a comprehensive report, the Cincinnati Chapter of the American Institute of Architects has launched a movement for a State registration system for architects.

A Three-Family House in Pensacola

Practical Details Relating to a Style of Multiple-Dwelling Quite Common in the City Named

WE take pleasure in presenting herewith an interesting example of the style of flat building or small apartment house which is quite common in Pensacola, Fla., and which seems to be growing in public favor. The floor plans are such as to furnish accommodations for three families, there being one upon the main or ground floor and two upon the second floor. It will be seen that in the latter case the living room is converted at night into a sleeping room by the use of the "disappearing bed," which occupies space under the bookcase and extends into a wardrobe. A dressing room with running water adjoins the wardrobe and this arrangement is duplicated for the family occupying the rear portion of the house. The kitchen is compact and conveniently equipped, cooking being accomplished by means of a gas range. The bath room is so located as to be readily accessible by both families.

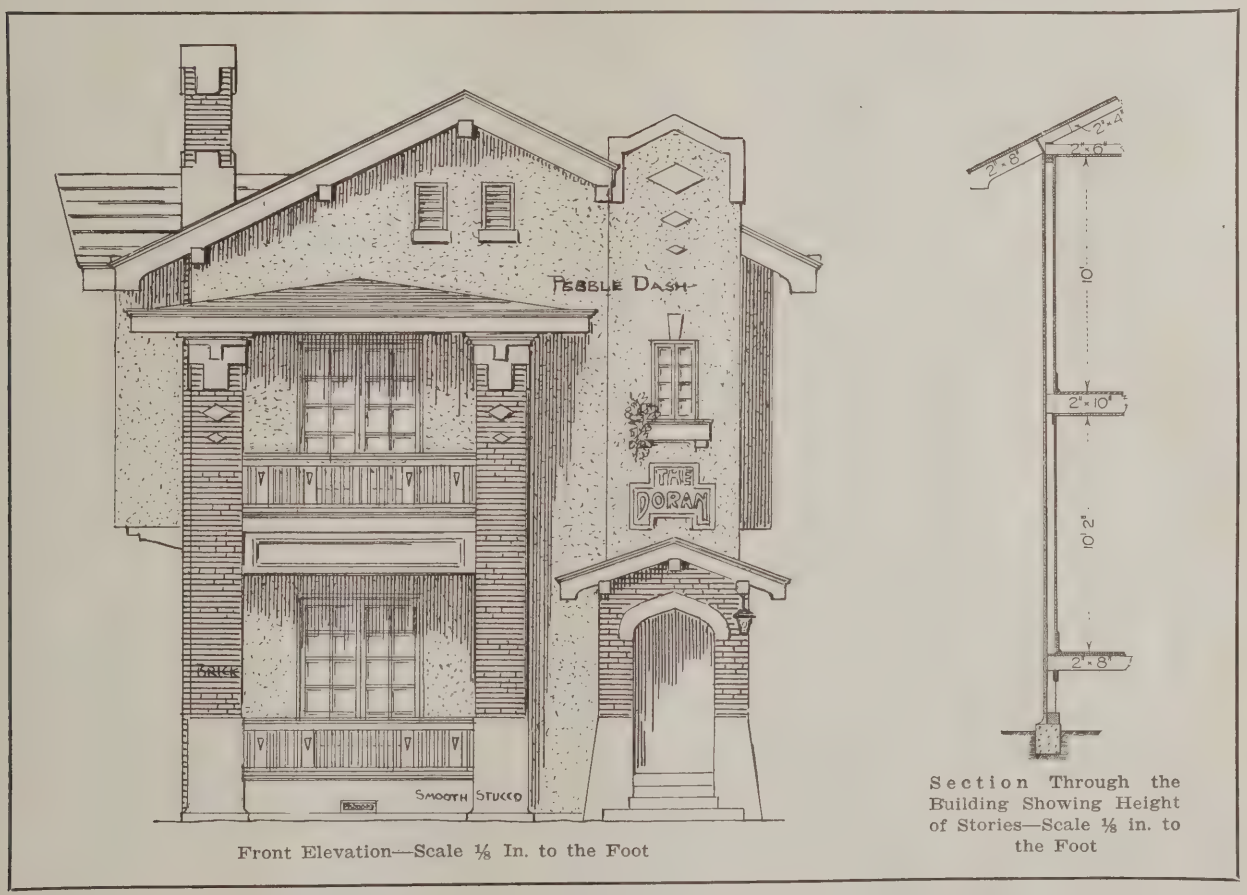
As few buildings in Pensacola and vicinity have cellars, none is required for the multiple dwelling here shown. The frame is of the usual style, but the outside is covered with wire lath to which stucco is applied having a "pebble dash" finish. The inside of the building is finished with hard plaster. The sills are creosoted so as to render them more durable than would otherwise be the case. The building is covered with vulcanite asphalt roofing and the ventilator has a fancy top as compared with the vents usually found protruding through the roofs of dwellings in more northern sections of the country.

All interior trim is of "A" grade Florida pine and is hand smoothed. The vestibule has a floor of encaustic tile while the floors of the kitchen and bath room are of Everlastic cork tiling. The woodwork is stained and has a wax finish while the interior walls are tinted.

There are four intercommunicating house telephones, an electric front door opener and the disappearing beds are in ventilated cases when closed.

The plumbing and fixtures are of standard type and what little heating is required is furnished by the open grates which are provided with ash dumps.

The figures of cost, as furnished by the architect are as follows:



Front Elevation—Scale ⅛ In. to the Foot

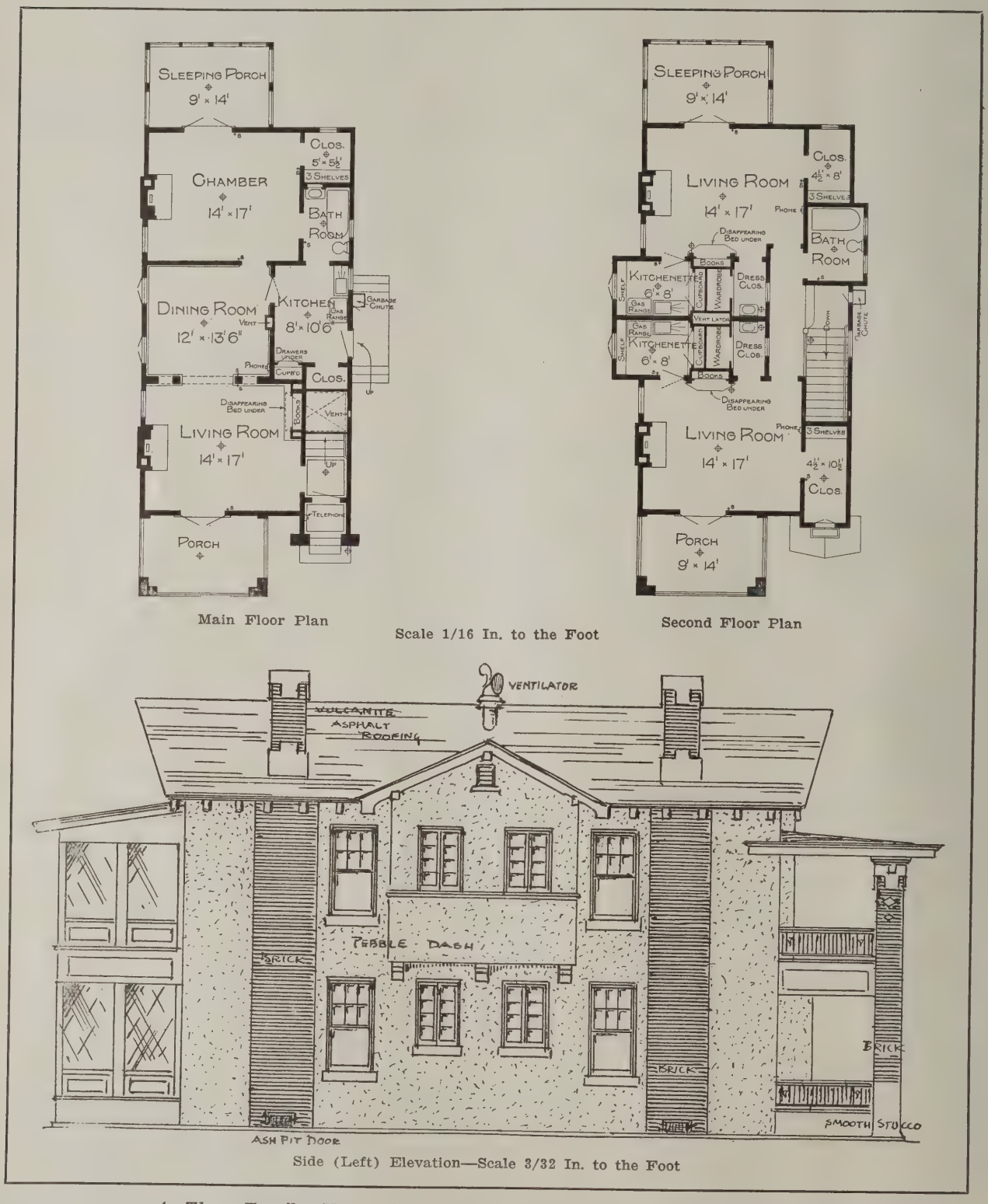
Section Through the Building Showing Height of Stories—Scale ⅛ in. to the Foot

A Three-Family House in Pensacola, Fla.—Architect, W. C. Frederic

Excavating and grading	$25.00
Masonry and concrete work	365.00
Stucco work	280.00
Interior plaster work	325.00
Tile floors	150.00
Lumber and mill work	1,150.00
Carpenter labor	925.00
Hardware, rough and finish	150.00
Painting, staining and tinting	300.00
Metal work (gutters and down pipes, etc.)	47.00
Plumbing, gas fitting, etc	300.00
Mantels and grates	120.00
Electric wiring	90.00

The three-family house here shown was designed by W. C. Frederic, architect, Suite 415 Thiesen Building, Pensacola, Fla.

In discussing the construction of concrete buildings in a paper before the Boston Society of Civil Engineers, Leonard C. Watson advises casting the



A Three-Family House in Pensacola, Fla.—Floor Plans and Elevation

Lighting fixtures, switches, phones	200.00	
Three disappearing beds complete	90.00	
Vulcanite asphalt roofing	85.00	
Extra for small items	45.00	
		$4,647.00
The architect's commission	235.00	
		$4,882.00

stairs considerably later than the floors and in a separate operation. In casting the floors, rods are left projecting from the floor to bond in the stairs, thus preserving the same measure of strength in the latter as would be the case were the whole job done at one and the same time.

Roofing in Chile

The material mostly used for roofing in Chile is corrugated iron, plain or galvanized, says United States Consul General L. J. Keena, writing from Valparaiso.

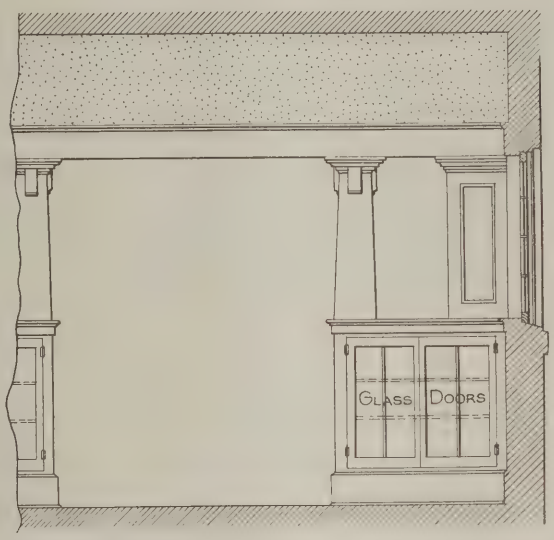
There are two reasons for this general use of corrugated iron for roofing purposes—first, because, as Chile is a country subject to periodical earthquakes, a light roofing is needed; second, because the heavy rains in central and southern Chile make necessary a roofing which will give substantial protection.

To introduce any other type of roofing in Chile would be difficult. Possibly the port through which it would be most easy to introduce prepared roofing would be Antofagasta, as that northern section of Chile has little or no rainfall.

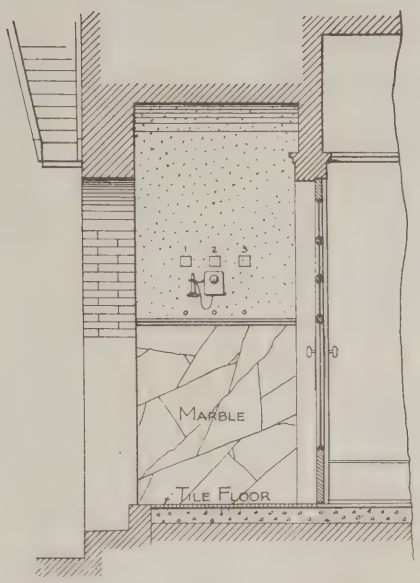
Chile offers an excellent opportunity for the introduction and sale of wall board for ceilings. The type of ceiling generally found there is of matched wood. Earthquakes make it impossible to use plaster ceilings. The lumber employed for ceilings is partly of native production and partly imported from the United States and Canada.

A wall-board ceiling should have an advantage over the wooden ceiling, both in the matter of lightness of weight and ease of placing.

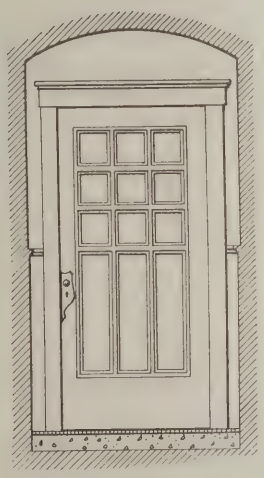
The present general type of construction calls for the use of wooden studding, filled in with adobe bricks for all inner and to a considerable extent also for outer walls in houses.



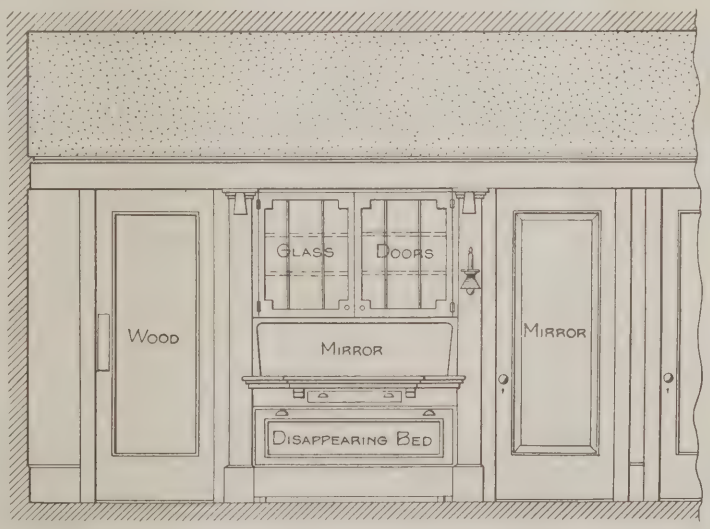
Dining Room Side of Opening Between It and the Living Room on the First Floor Showing China Closets
Scale ¼ In. to the Foot



Elevation of One Side of the Vestibule—
Scale ¼ In. to the Foot



Rear Door of Vestibule —
Scale ¼ In. to the Foot

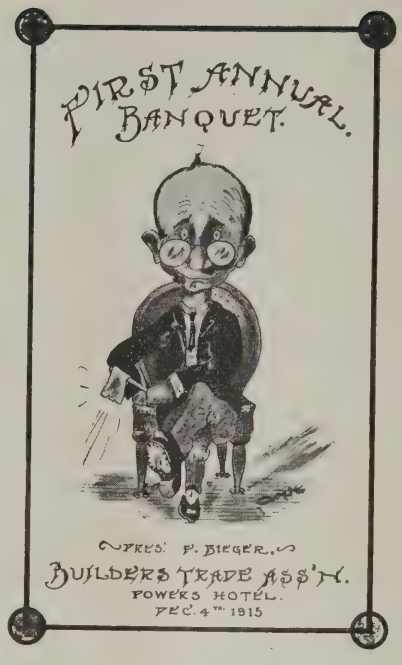


Elevation in Living Room on Second Floor Looking Toward the Disappearing Bed and with Door to Kitchenette at the Left and Door to Dressing Closet on the Right—Scale ¼ In. to the Foot

A Three-Family House in Pensacola, Fla.—Miscellaneous Constructive Details

Timber-frame buildings on the Panama Canal zone are made ant-proof by resting the posts on concrete footings having shallow gutters. The gutters are kept filled with the standard larvacide used by the sanitary department.

Banquet of Builders' Rochester Trade Asso.



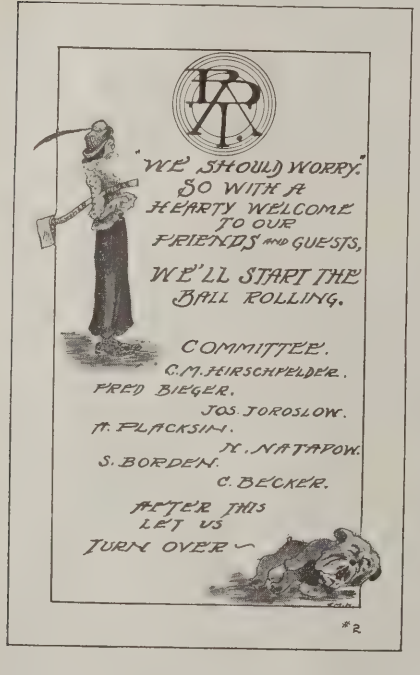
A "Red Letter" Night in the History of the Organization—Important Features Pictorially Described

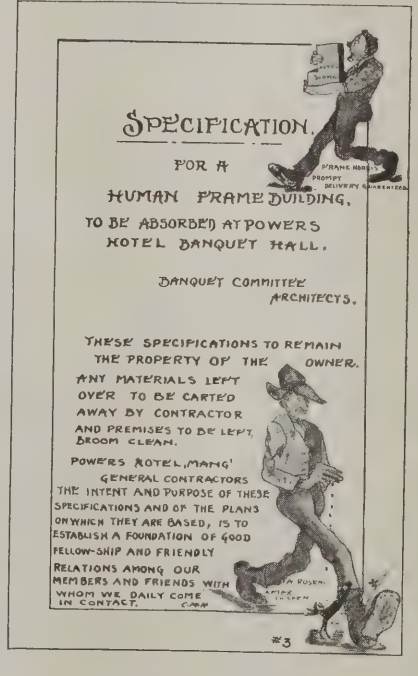
THERE is in the city of Rochester an organization of prominent contractors identified with the industry, which THE BUILDING AGE represents, known as the Builders' Trade Association. The members are of the right sort and believe in the establishment of a firm foundation of good fellowship and friendly relations not only among themselves but also among the business associates with whom they daily come in contact. With a view to promoting this delightful sentiment the members of the organization, together with numbers of their friends, gathered at Powers Hotel on the evening of December 4 for the purpose of celebating the first annual banquet of the association.

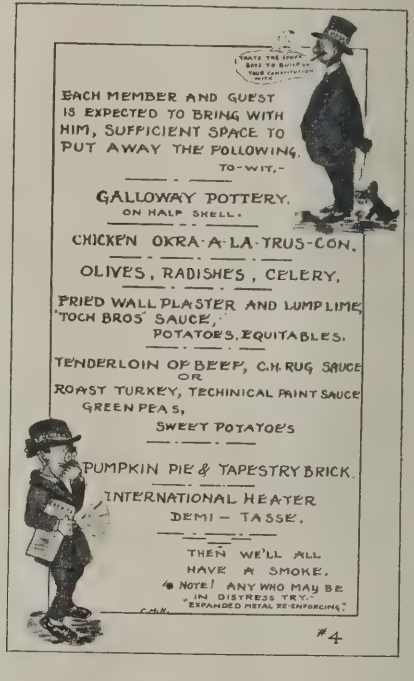
The committee having the affair in charge was composed of C. M. Hirschfelder, Frederick Bieger, Joseph Joroslow, A. Placksin, N. Natapow, S. Borden and C. Becker, all of whom entered enthusiastically into the spirit of the occasion and determined to make the affair a "red letter" night in the history of the association and one which would be so pleasantly remembered as to mark it hereafter as one of the annual functions of the organization.

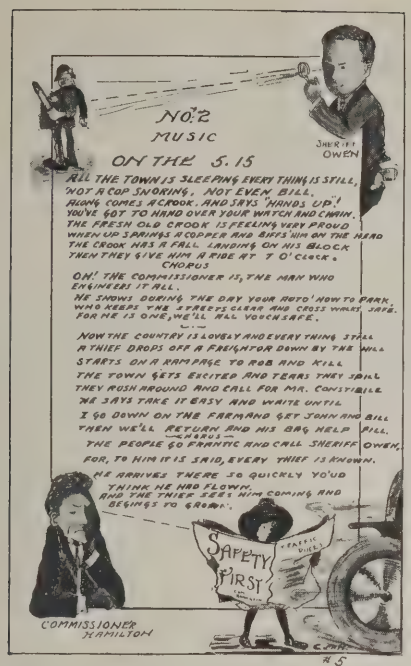
As is customary on such occasions there were delightful talks by officials of the organization and others prominently identified with the building and allied trades, and while the comments largely had to do with a serious consideration of leading aspects of the subjects discussed, a lighter vein of humor percolated through it all in a way which kept the members and guests constantly on the *qui vive*. The entertainment was charming in all its aspects and the spirit of good fellowship prevailed.

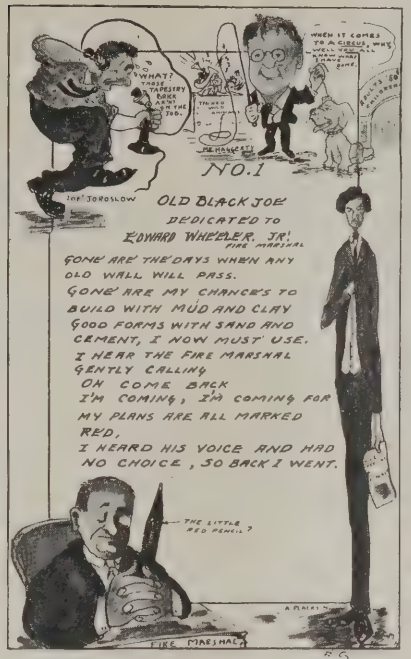
One of the features most unique in its way and which attracted much favorable comment was the style of the *menu*. This was in the form of a set of blue print specifications bound together at the top

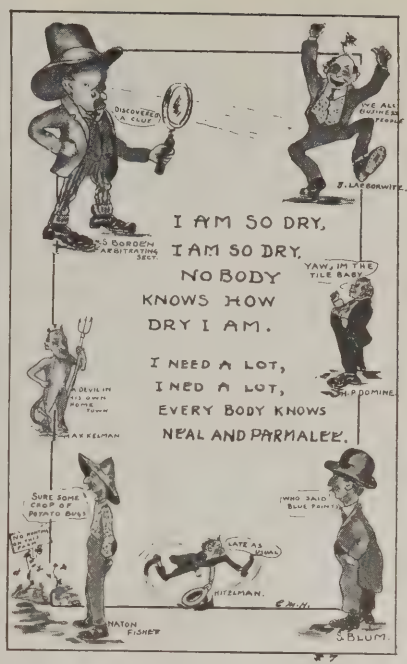












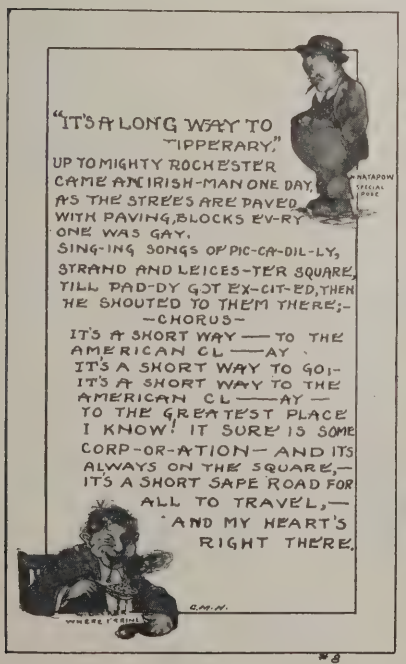
in regulation architectural style and bearing upon the first page a cartoon of the presiding officer. The caricatures throughout were admirably executed and the pleasantries evoked roars of laughter. Across the face of the first page was the rubber stamp of Fire Marshal Edward Wheeler, Jr., reading "Approved Dec. 4, 1915. Any alterations of these plans without permission from this office is a violation of the Building Ordinance subject to a fine of $150.00. E. W., Jr."

There were ten pages of the specification *menu*, each page a cartoon of a decidedly clever nature and taking off incidents which the members did not fail to appreciate as well as outlining the "bill of fare" in a most humorous vein.

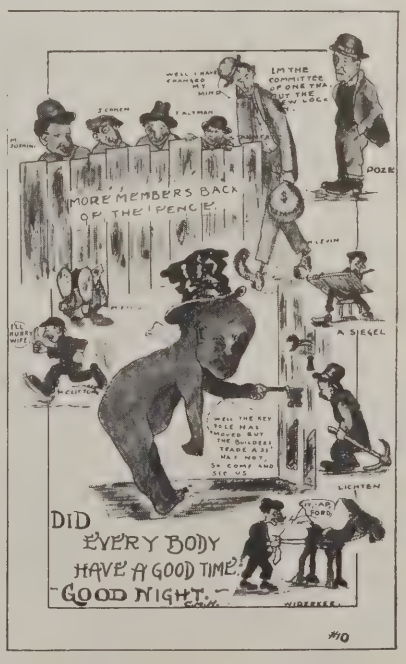
The *menu* was the work of Mr. Hirschfelder, chairman of the Entertainment Committee, a young architect of the city whose talent in this line is decidedly beyond the ordinary and who, in following the practice of architecture, has evidently mistaken his vocation. As will be seen from the cartoon sketches which it is our privilege to reproduce with such fidelity of detail as the limitations of the engraving process will permit, the drawings are full of life and action and certainly reflect great credit upon the artist who prepared them.

A Wooden Table of Many Pieces

A carpenter by the name of Stephen Horosak of Auburn, N. Y., has just finished, after six months' work, an inlaid table containing 28,996 separate pieces. The table is highly polished and set in the top is a perfect American flag held in the talons of an eagle. Around the top are set mosaics of different colored woods of geometrical shapes arranged in a border. The same general design is followed in the decoration of the legs and pedestal.







Country House of Frame Construction

A Well-Planned Home with an Exterior of Clapboards and Roof Covered with Shingles



THE subject of our colored supplemental plate this month is an attractive country house of colonial style, noticeable features being the open porch at one end, the gambrel-shaped roof and the dormer windows which pierce the lower slope of the front roof.

The house was designed for a plot of ground having a frontage of 75 or 100 ft., and it should be placed with its broad façade to the road, this giving a more impressive effect. The house should be set back 25 or 30 ft. from the front line of the lot, thus permitting of an ample lawn which may be laid out with flower beds, shrubbery or other landscape features.

The Foundation Work

According to the architect's specifications there is to be a cellar under the entire house, this to contain the furnace and storage rooms. All footings and foundation walls are to be of concrete mixed in the proportions of one of cement to three of sand and five of broken stones. The foundation walls are to be 10 in. thick resting upon footings 10 in. thick and 20 in. wide.

All framing timbers are to be of spruce. The sills are to be 4 x 6 in., the girders 6 x 8 in., and the floor beams 2 x 10 in., placed 16 in. on centers. The floor beams are to be strengthened with rows of 2 x 4 in. cross bridging, spaced about 6 ft. apart. The rafters of the main roof are to be 2 x 8 in. placed 20 in. on centers and the dormer rafters 2 x 6 in. also placed 20 in. on centers. The corner posts are to be 4 x 6 in., and the studding 2 x 4 in., placed 16 in. on centers braced with cross bridging. The ridge board is to be 1½ x 10 in. The porch roof rafters and floor beams are to be 2 x 6 in., placed 20 in. on centers.

The Exterior Covering

The exterior walls of the building are to be covered with hemlock sheathing boards laid diagonally and these to be covered with a layer of heavy building paper. Over this in turn are to be placed pine clapboards 6 in. wide and painted a cream white.

The roof is to be covered with red cedar shingles laid 5½ in. to the weather and stained a dark sap green to contrast with the color of the siding.

The outside trim as well as the siding is to be painted two coats white lead and oil. All ceiling boards on the porch ceiling and the underside of the cornice are to be varnished.

The chimney is to start from a concrete base and be built of brick and capped above the roof, as shown in the picture forming the basis of the supplemental plate. All flues are to be lined with vitrified flue lining.

The rooms of the first story are to have double floors, the rough flooring to be of 1 x 6 in. North Carolina pine and the finish floor in the living room, the dining room and the hall to be of ⅞ x 2½ in. maple. All other rooms on the first and second floors are to have ⅞ x 2½ in. North Carolina pine flooring. All floors are to be finished natural, a paste filler being used and the succeeding coats flat varnished.

The Interior Finish

The interior finish of the living room, the dining room and the hall is to be cypress, while all other rooms are to be finished in white pine.

The trim in the living and dining rooms, hall and vestibule is to be finished in old mission, and all plaster work to be tinted with the exception of the ceilings, which are to be left pure white.

The bed room trim is to be painted or enameled white and have a velour finish. All doors are to be of birch and stained a rich mahogany.

All interior plastering is to be two-coat work and have a smooth hard finish except in the living room, the dining room and the hall, which shall have a sand finish.

The walls of the kitchen and pantry are to be treated with a good enamel paint.

The bath room floor is to be of tile and have a sanitary cove and base. Its equipment shall consist of porcelain enamel bath tub, water closet with low down tank and wash stand with china basin and marble top.

All windows are to be glazed with double thick American glass, and the hardware in the living room, dining room and the hall is to be of an old antique mission finish. The hardware throughout the rest of the house is to be of dull bronze finish.

The Lighting Arrangement

The house is to be piped for gas and wired for electric lighting. All rooms are to have outlets for gas fixtures and so arranged that combination fixtures may be used. All lighting fixtures are to match the hardware in finish and design. The living room is to have two drop pendants of two lights each and two wall outlets. The dining room is to have a drop pendant of three lights. All rooms will have one side wall and one ceiling outlet, while the halls are to have ceiling outlets.

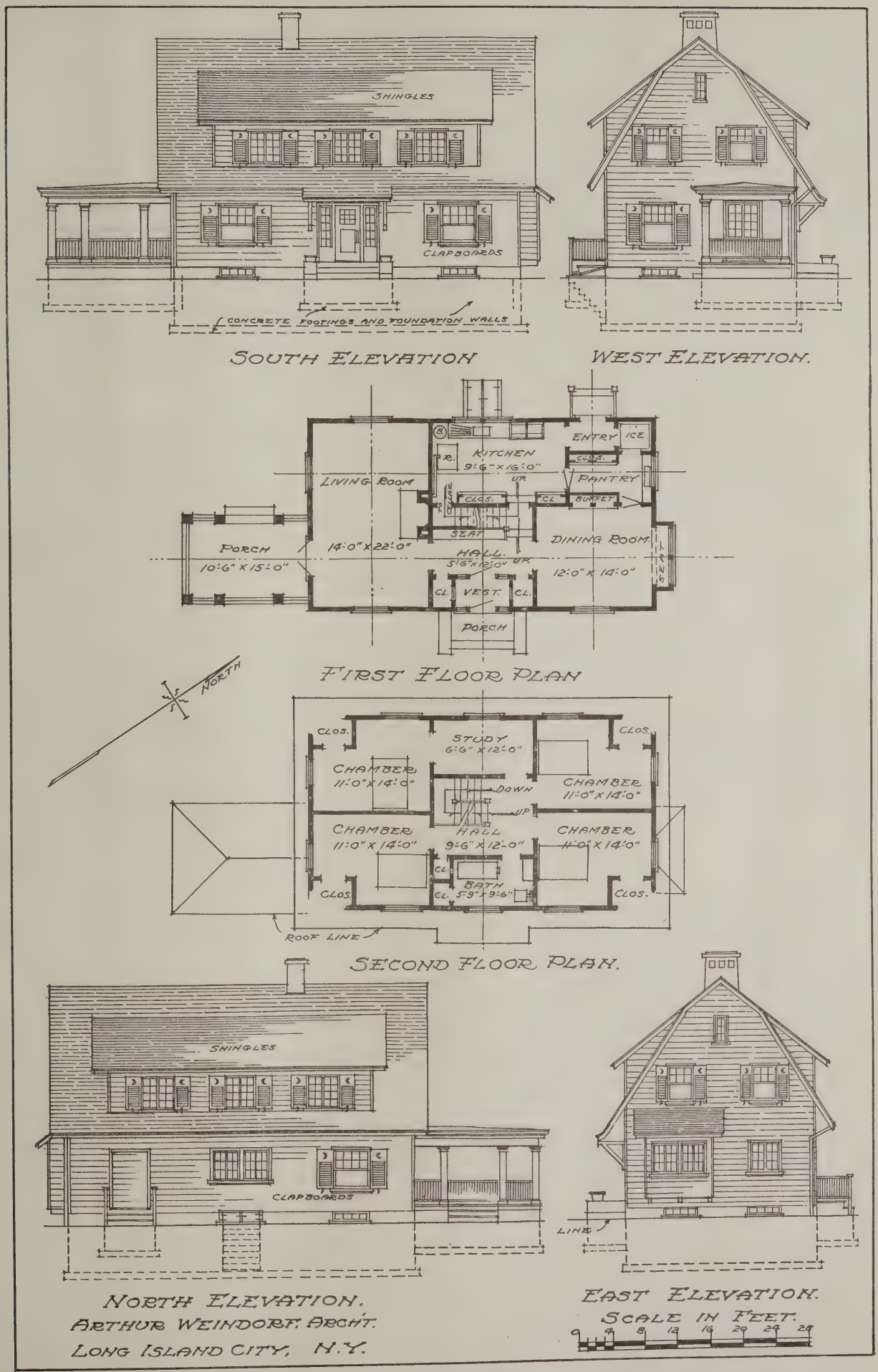
A hot water heating system is to be installed in the cellar and is to be of sufficient size to properly heat the building to 70 deg. in zero weather. All pipes in the cellar are to be covered with asbestos. All radiators are to be of such finish as to match the hardware.

The country house here shown is intended for a family of five persons with a spare room for guests

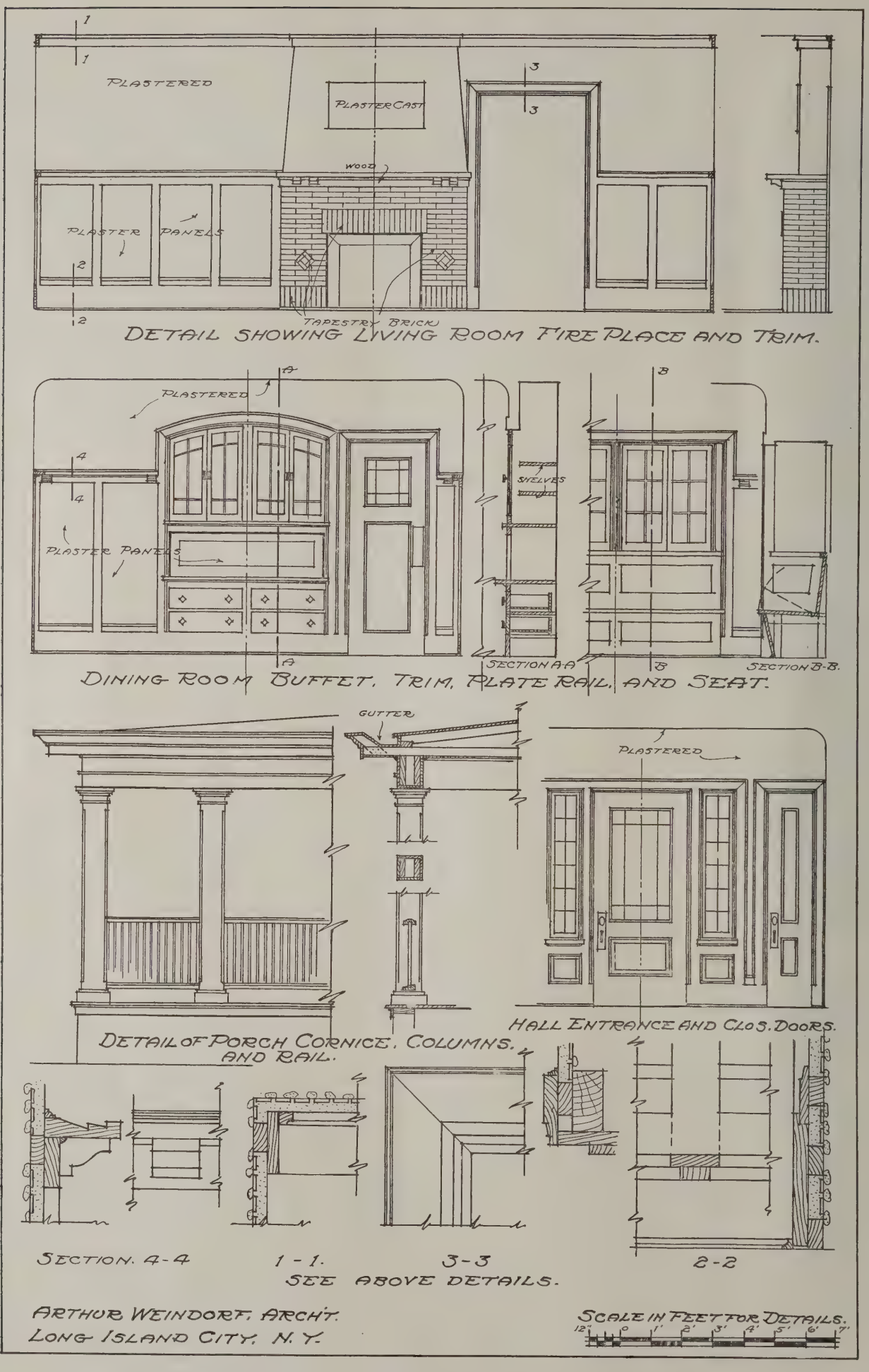


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Plans and Elevations of the Country House Shown on the Colored Supplemental Plate



Miscellaneous Constructive Details of Country House Shown on Colored Supplemental Plate

and a servant's room in the attic. All rooms have ample ventilation and light and all sleeping rooms have clothes closets. The arrangement is such that there is easy communication from the kitchen to the second floor chambers, also to the cellar and to the front door. At the rear entry the arrangement is such that ice can be supplied to the refrigerator without the necessity of coming into the house. One chimney supplies the kitchen range, living room fireplace in the cellar.

The dining room is of good size and contains a built-in buffet and window seat. The kitchen is of good size and has range, sink and wash trays within easy reach. The pantry gives direct access to the dining room and contains cupboards, sink and entrance to the icebox. The hall opens directly into the living and dining rooms and contains two large closets and a comfortable seat.

The living room is large, light and airy, the trim is very plain and French casements open from this room onto a private porch.

The plumbing is of standard make, and all exposed pipes in the bath room have nickel-plated finish. All exposed pipes in the kitchen are to be painted with enamel paint. The kitchen equipment includes an iron enamel sink, a two-part wash tray of soapstone and a 40-gal. galvanized iron boiler to be connected with the range and with the furnace in the cellar.

The cubic content of the house equals 28,604 cu. ft., which, according to the architect, should cost 19 cents per cu. ft. He points out that the estimate and specifications are based on prices, labor and materials about 40 miles from New York City on Long Island.

The design was prepared by Architect Arthur Weindorf, Long Island City, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, N. Y.

Roof Framing with the Steel Square

Some Figures On the Square to Use in Cutting Rafters of Various Rise and Run

BY D. P. BARRY

SUPPLEMENTING what appeared in the October issue on the above subject, I am presenting some figures on the steel square which the practical carpenter and builder will find useful in cutting common hips and valley rafters. At the outset I would suggest that before cutting the rafters the following tests be applied:

For ¼ pitch multiply the span by 0.559
For ⅓ pitch multiply the span by 0.6
For ⅜ pitch multiply the span by 0.625
For ½ pitch multiply the span by 0.707
For ⅝ pitch multiply the span by 0.8
For Gothic, multiply the span by 1.12

Figures to use on the square to cut sheathing for square roofs:

For ¼ pitch; 10¾ on tongue and 12 on blade.
For ⅓ pitch; 10 on tongue and 12 on blade.
For ½ pitch; 8½ on tongue and 12 on blade.
For ⅝ pitch; 6¾ on tongue and 12 on blade.

This sheathing is of course the roof boards. The figures cut the top side of the boards for hips and valleys, and they will also cut the plancier and edges of facia cut by the tongue.

The edge cut for the same respective pitches is shown below:

For ¼ pitch; 5⅜ on tongue and 12 on blade.
For ⅓ pitch; 6⅝ on tongue and 12 on blade.
For ½ pitch; 8½ on tongue and 12 on blade.
For ⅝ pitch; 10 on tongue and 12 on blade cut by tongue.

This will cut both roof board and plancier edges as well as side of facia.

A simple rule for getting the backing of hip rafters and the grooving of valley rafters in addition to what I have given is as follows:

Gage the rafters on the center of the top edge; then take the length of the hip or valley on the blade and the rise of these rafters on the tongue; place these figures on the gage lines and mark by the tongue, reverse the square; then square across the rafter and you have the bevel to work to.

The following are the figures to use in cutting the rafters:

Rise	Run	Cuts for Com. Rafters; Hips and Val.	
3 in.	12 in.	3 x 12	3 x 17
4 in.	12 in.	4 x 12	4 x 17
5 in.	12 in.	5 x 12	5 x 17
6 in.	12 in.	6 x 12	6 x 17
7 in.	12 in.	7 x 12	7 x 17
8 in.	12 in.	8 x 12	8 x 17
9 in.	12 in.	9 x 12	9 x 17
10 in.	12 in.	10 x 12	10 x 17
11 in.	12 in.	11 x 12	11 x 17
12 in.	12 in.	12 x 12	12 x 17
13 in.	12 in.	13 x 12	13 x 17
14 in.	12 in.	14 x 12	14 x 17
15 in.	12 in.	15 x 12	15 x 17
16 in.	12 in.	16 x 12	16 x 17

Rise of Rafter	Run of Rafter	Figures on Square by Which to Cut Cripples
3 in.	12 in.	12⅜ and 12
4 in.	12 in.	12⅝ and 12
5 in.	12 in.	13 and 12
6 in.	12 in.	13½ and 12
7 in.	12 in.	13⅞ and 12
8 in.	12 in.	14⅜ and 12
9 in.	12 in.	15 and 12
10 in.	12 in.	15⅝ and 12
11 in.	12 in.	16¼ and 12
12 in.	12 in.	17 and 12
13 in.	12 in.	17⅝ and 12
14 in.	12 in.	18½ and 12
15 in.	12 in.	19¼ and 12
16 in.	12 in.	20 and 12

Cut by the varying figures. For the top cut of hip and valley rafters use the same figures as for cripples, except cut by the 12 side of the square. These figures are for rafters that are backed.

The following are the figures to use for the top cut on the hip and valley rafters. The rafters are not backed:

Rise of Rafter	Run of Rafter	Figures to Cut By
3 in.	12 in.	11¾ and 12
5 in.	12 in.	11½ and 12
6 in.	12 in.	11⅜ and 12
7 in.	12 in.	11¼ and 12
8 in.	12 in.	11 and 12
9 in.	12 in.	10¾ and 12
10 in.	12 in.	10½ and 12
11 in.	12 in.	10¼ and 12
12 in.	12 in.	10 and 12
13 in.	12 in.	9¾ and 12
14 in.	12 in.	9½ and 12
15 in.	12 in.	9¼ and 12
16 in.	12 in.	9 and 12

8¾ and 12 cut by the 12

Figures showing length of rafter for 1-ft. run for the same roof pitches:

Rise of Rafter	Run of Rafter	Length Com. Rafter	Hip or Val. Rafter
3 in.	12 in.	12.37	17.23
4 in.	12 in.	12.65	17.43
5 in.	12 in.	13	17.69
6 in.	12 in.	13.41	18
7 in.	12 in.	13.89	18.36
8 in.	12 in.	14.42	18.76
9 in.	12 in.	15	19.21
10 in.	12 in.	15.62	19.69
11 in.	12 in.	16.28	20.22
12 in.	12 in.	16.97	20.78
13 in.	12 in.	17.69	21.37
14 in.	12 in.	18.44	22
15 in.	12 in.	19.21	22.64
16 in.	12 in.	20	23.31

Some of these figures are given on some of the squares. Suppose a roof rises 8 in. per foot run and is 16 ft. wide; to get length of rafters we have $14.42 \times 8 = 115.36$ in., or 9 ft. 7⅜ in. for length of common rafter. $18.76 \times 8 = 150.08$ in., or 12 ft. 6¼ in. the length of the hip or valley rafter.

In reading over the article in the October, 1915, issue I found a few errors of omission and commission. In the printed matter 8 ft. 8 in. should read 9 ft. 8 in. In the last proportion 4 ft. should read 2 ft. The sentence giving the cuts for hip and valley rafters to fit against the ridge or themselves implied that the rafters are backed. The figures for rafters not backed are given above. Condensing all the rules into one that will apply on all kinds and pitches of roofs, we have:

Take the length of the common rafter, *c-b* of Figs. 3 and 4 on the blade and the length of the ridge *r* or the plate *r, r,* same figures, Oct. issue, on the tongue and cut by the blade.

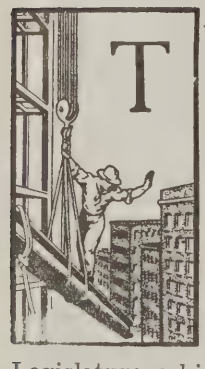
One need not care anything about the run of the rafters or the pitches of the roofs.

After all that has been said there are those who cannot follow it. If these persons will put the vertical cut line on their cripples then measure down or up the rafter, according to the kind of cripples they are cutting, a distance equal to the thickness of the cripple then square across the rafter, make another vertical line and connect the two verticals they will have a perfect cut.

Another good way to get all the bevels is to consider *a-c* and *b-c* of Figs. 3 and 4 of the article in the October issue as chalk lines. We use silk lines in this way to get the bevels for spouting in flouring mills, as it is rapid and absolutely accurate.

Building Boom vs. Unfair Lien Laws

Some of the Reasons Put Forth Explaining the Check to Local Building Operations



THERE seems to be a feeling in many lines that one of the main factors in preventing an immediate resumption of building operations on a large scale in Greater New York is the unfairness of some of the existing lien laws, and with a view to correcting the evils, leading building supplymen in common with sub-contractors are said to be organizing for a redress of grievances through the Legislature, which convenes at Albany in January. In regard to this matter President P. H. Hart of the Building Trades Credit Association of New York says:

"Drastic changes in our laws must be made, and with those changes will come a 'boom' in construction work such as New York has not known in a long time.

"At present the sub-contractors and material men are at the mercy of contractors, builders and owners. Grant the honesty and conservatism of those with whom we do business and we are all right. But the trouble is that the 'wildcat' and dishonest speculative builder frequently comes to us with a good reputation and a fair statement of equities, which are mortgaged soon after contracts are signed.

"For several years conditions in the building trade in New York have been growing steadily worse, until to-day, though we are all ready for a building 'boom,' we still are in a state of demoralization. Correct a few of our laws and there will be so much building that it will be difficult to supply the necessary amount of labor in the city.

"Fraudulent practices on the part of builders, contractors and loan men, who are permitted to operate 'within the law,' are responsible to a large extent for the present stagnation. Liens filed when there has been no default under contracts have in many instances brought ruin to builders, and building operations, sound in all respects, have terminated disastrously because of unnecessary embarrassment on the part of the builders precipitated by the filing of one lien that brought an avalanche of others, which subsequently could not be lifted without the unanimous consent of all the lienors.

"For five years we have been working to have the existing lien law changed in order to lessen such fraudulent practices and others, and in order to conserve assets to meet claims.

"In many States the sub-contractor has for his labor done or material furnished a lien upon the building and also upon the land on which the building is situated. The lien is frequently superior to all other encumbrances or has priority over mortgages recorded after ground is broken, and builders and owners in those States do not find the law oppressive. The dishonest builder, however, and the 'wildcat' speculator seldom operate in those States. There are not the same 'opportunities.'

"What we demand in this State is a law abolishing priority in liens, giving an extension of right to file liens in certain cases against mortgages and purchasers and as against assignees of moneys due,

and extension of right to file liens in favor of certain trades not now protected.

"All liens should be made concurrent upon the property improved and all liens should be paid pro rata, except as to laborers.

"When this is done the filing of one lien will not precipitate a rush to file other liens. Creditors will take their time; they will investigate and inquire as to whether the first lien was justified and necessary. Combinations will be prevented between the builder and a lienor at the top of the list to wipe out the subsequent ones through foreclosure.

"Such a law as we ask will make it possible on the failure of a general contractor for all the sub-contractors to get together, complete the contract and share equally in the fund. We would stop the 'blackmail liens' that now frequently are filed. Many dishonest contractors terrify a builder into modifying a contract and changing the price and terms simply by threatening to file a lien which the builder well knows will tie up his work and possibly ruin him.

"We demand that the law shall compel that immediate record be made of assignments of payment on public works by a contractor, so as to at least notify the sub-contractors and material men, whose labor and material have been assigned, in advance.

"Most emphatically we demand redress against those dishonest builders who by means of second and third mortgages, defraud all connected with them.

"These are some of the reforms demanded by sub-contractors and material men. We have asked for relief from other Legislatures, but this time we are going to Albany with a very strong combination back of us. The Credit Association of the Building Trades of New York has invited all reputable sub-contractors and material men to join us; they are responding in a manner that demonstrates their interest. We also have the support of the big money lending institutions and the larger real estate interests. We are going to get that legislation which we need, and the New York building trades will prosper."

Opportunities at the Cement Show

Some of the Features Which Will Greatly Aid the Practical Builder in His Business Relations



THE coming Cement Show to be held in Chicago in February will probably be the largest and best that has ever occurred in the short but remarkable history of this progressive movement started eight years ago. There are thousands of building contractors who have attended this annual affair ever since the initial opening, making the trip a happy combination of business and pleasure. There are many logical reasons why contractors from Maine to California and from Canada to the Gulf visit the show each year. They consider it a profitable investment by realizing, first of all, that it is by far the most opportune time to let business take care of itself for a week or so. When times are dull, and snow lies thick on the ground, then thought is concentrated on what the forthcoming building season has to offer. These men who always visit the show are in distinct contrast to the unprogressives who stay at home year after year, continuing the same work in the same monotonous fashion, never gaining much, never losing much; lacking business punch, originality and initiative.

But to the business builder, the aggressive, ever-alert architect-builder and contractor, the Cement Show, immediately preceding the building season, is a timely event for the investigation and purchase of modern equipment and materials.

Profitable expansion should be the ambition of every building contractor. It is possible to learn where bigger and more desirable business is to be had by mingling with the manufacturers at the Cement Show. These concerns employ salesmen, mostly practical men, who are familiar with every phase of construction work. They are cognizant of cheaper and more efficient ways of accomplishing certain results, and the information is available for the builder for the asking. They will help solve his problems; will point the way to his establishing closer connections with his customers and prospective clients; will show him what opportunities there are in the field.

The Cement Show will broaden his mind. He will be greeted by men who make business a pleasure. Thousands of men will be there, who, like himself, are anxious to learn new methods. With them he may profitably discuss his personal activities, his costs, his prospects. This interchange of ideas, getting the other fellow's viewpoint, is worth more than dollars and cents to the appreciative builder, yet he will gain these dollars and cents in the long run by assimilation, cultivation, and intensive application of the knowledge thus acquired.

The Cement Show has always been held in the Chicago Coliseum, but so fast has been its growth that this year both the annex and the adjacent armory have been leased in order to accommodate the manufacturers. Twenty-six cement companies, shipping cement within 1000 miles of Chicago, have entered into an agreement to participate in a $10,000 exhibit of concrete products which will occupy the entire south half of the armory. The materials for this exhibit will be drawn from the resources of practically the whole

cement industry, including the Association of American Portland Cement Manufacturers. All duplication of effort by cement companies will be eliminated by a joint exhibit plan which will enable the cement manufacturers to install such a display of concrete products as has never before been attempted. Unquestionably, this joint exhibit will set forth the possibilities of concrete in such a manner as will enable the visitor to acquire a broad and intimate knowledge of the uses of cement.

Particular attention will be paid to the surface treatment of concrete. There will be demonstrations of bush hammering, acid treating, brushing with water, and other methods of treating surfaces, and these will be taught in what might be termed a school for builders. This feature will be a part of the joint exhibit.

The builder will surely feel at home at the Cement Show, and the trade papers stand ready to do their share to make his visit a pleasant and profitable one.

Our greeting is: Make the booth of THE BUILDING AGE your information bureau. Its representatives will do all they can to assist you. If you are planning to spend a week in Chicago, you will undoubtedly want to see the points of interest, visit the best theaters, etc. THE BUILDING AGE men will be well posted, and they will be at your service from Feb. 12 to 19. Your wishes will be their pleasure.

Mark the date on your calendar—Feb. 12 to 19. If you decide to spend but one or two days there, you will leave with the resolve that next year will find you on hand from start to finish.

Handbook for Architects and Builders

We have received a copy of the eighteenth annual edition of the above work, just off the press, which is the official publication of the Illinois Society of Architects. The volume this year is up to the usual high standard and contains much valuable information for the architect, as it furnishes him with information under one cover which he requires in the daily practice of his profession. Among the many things to be found within the covers of the book are the Building Ordinance of the city of Chicago with all of the amendments up to July 15, 1915; a complete and comprehensive index covering the sections in the Ordinance; all of the Special Rules of the Building Department with indications at the beginning of each section of the Ordinance to which the ruling applies; a revised Schedule of Charges for Architects as recommended by the Illinois Society of Architects; a list of architects licensed to practise in Illinois; a list of members of the Illinois Society of Architects as well as of the Illinois Chapter of the American Institute of Architects; rules of the Telephone, Gas and Electric Light companies; Standard Specifications for Hollow Tile Fireproofing; Rules of Measurement for Excavation and Concrete Work; Standard Specifications for Structural Steel; Specifications for Billet-Steel Concrete Reinforcement Bars; Strength of Materials; Specifications for Plain Concrete Floors; Formula for Heating and Ventilating; Sections of the Sanitary Code of interest to architects with index; Office Practice as recommended by the Society; Paints to Prevent Electrolysis in Concrete Structures, by H. A. Gardner; Rules for Measurement of Plastering, also numerous rules and tables, such as Ultimate and Safe Strength of Iron and Steel in Pounds per Square Inch; Percentage of Hooping for Various Core Diameters and Hooping for Reinforced Concrete Columns, by Benjamin E. Winslow; Weights of Materials, the Orders of Architecture, etc., etc.

Not the least attractive features of the valuable work are engravings of the officers of the Illinois Society of Architects and of the State Board of Examiners of Architects. In passing, it may be stated that the book is published in the interests of the architects of the State of Illinois and is distributed to them free of charge. The work is edited by Emery Stanford Hall, Chairman of the Legislative Committee of the Illinois Society of Architects.

The Architectural League of New York

The thirty-first annual exhibition of the Architectural League of New York will be held in the building of the American Fine Arts Society, 215 West Fifty-seventh Street, New York City, from Feb. 6 to 26, inclusive. The annual dinner of the League will occur Friday evening, Feb. 4, and the League reception will be held on the afternoon of Saturday, Feb. 5.

This exhibition will consist of drawings and models of proposed or executed work in the structural, decorative and landscape architecture; with sketches and finished examples of decorative painting; sketches, models, and finished examples of decorative and monumental sculpture; drawings and models of works in the decorative arts and photographs of executed work in any of the above branches. There will be a competition for the Henry O. Avery Prize, and a special prize of $300, the latter being for the best design submitted by an architect, a sculptor and a mural painter in collaboration.

The subject proposed is the design of the interior of a small chapel not exceeding 16 x 36 ft. in plan and 24 ft. in height. The chapel is assumed to be built as a memorial to three brothers who had died in defense of their country and the pictorial and sculptural enrichment should be designed with a view to the glorification of patriotic self-sacrifice.

The Architectural League also awards a Medal of Honor to mural painters, and a Medal of Honor to sculptors represented in the annual exhibition.

Convention of American Concrete Institute

The annual convention of the American Concrete Institute will be held at the Auditorium Hotel, Chicago, Ill., on Feb. 14 to 17, inclusive, 1916, during the same week that the Ninth Annual Cement Show will be in progress in that city.

The French Pavilion at the Panama-Pacific Exposition was sold to a wrecking company for $2,000. Its original cost was $100,000.

Laying Out Face Mold in Stair Work

A Problem in Stair Building Likely to Interest Many Readers of The Building Age

A CORRESPONDENT of THE BUILDING AGE writing from Woodstock, Ont., has sent us the sketches, Fig. 1, showing a plan and elevation of a flight of stairs with side wreath and easement, and desires to know how to lay out the face mold for it. He says:

"It has a close string as shown with 7-in. rise and 10-in. run. The rise on the easement is 3½ in. higher than the regular pitch of the rail. The stairs are already up and I am awaiting a solution. If therefore Mr. Williams will give me a quick response I shall greatly appreciate it.

"I have followed a great deal of the work of Morris Williams and believe that he can give me the proper sketches for the solution of the above problem. I have been a subscriber to THE BUILDING AGE for a good many years and I am continually finding good things in its pages."

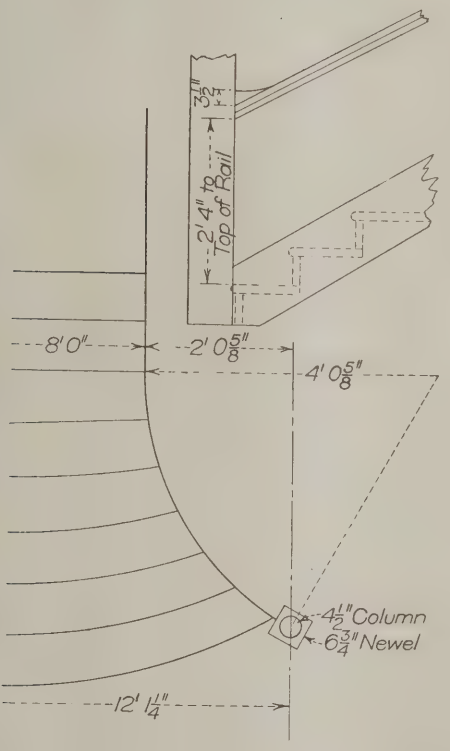


Fig. 1—Sketches Submitted by the Canadian Correspondent

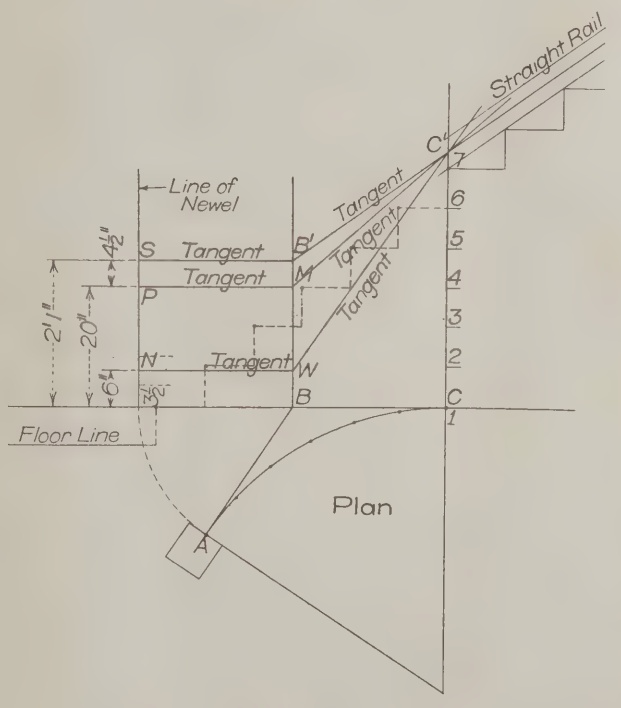


Fig. 2—Diagram Bearing Upon the Height of Rail and Length of Newel

Laying Out Face Mold in Stair Work

The problem of our correspondent was submitted to Morris Williams, who replies as follows:

The correspondent's sketches illustrate a turnout curve at the bottom of a stairway, the curve containing six steps. The elevation shows the top of the rail to be at a height of 2 ft. 4 in. above the nosing of the steps; then an easement 3½ in. higher than the regular pitch of the rail, which makes the height of the rail where it strikes the newel post 2 ft. 7½ in. plus the height of the baluster. The correspondent says that the stairs are "already up" and presumably the newel is also up. As a consequence the conditions as stated above must be adhered to.

In Fig. 2 is presented an explanatory diagram bearing particular relation to preliminary consideration regarding the height of rail and length of newel. In this figure is shown the elevation of the steps within and without the curve, also three different arrangements of the rail tangents. It will be observed that the bottom tangent in each case is a level line necessitated by the requirement of an easement in the wreath rail.

The bottom level tangent *N-W* shows the position required for it when the easement is to be 3½ in. higher than the regular pitch of the rail. The inclined tangent for this condition is shown from *W* to *C'* deviating from the pitch of the straight rail and therefore necessitating a ramp either in the wreath or the straight rail.

The objection to this arrangement of the tangents is, as shown at *W*, that it will cause the wreath rail to be too low.

Another position for the tangents is shown at *P-M* for the level tangent and from *M* to *C'* for the top tangent. In this case the easement would meet the newel at the height of 20 in. higher than the regular pitch of the rail, as shown at *P;* instead of 3½ in., as shown at *N*, thus necessitating that much additional length to the newel.

At *S-B′* and *B′-C′*, another position for the tangents is shown. In this case the pitch of the straight rail is continued to *B′* as shown and a level line drawn from *B′* to *S* for the level tangent. Here *S* meets the newel at a height of 2 ft. 1 in. higher than the regular pitch of the rail, as the correspondent terms the nosing line of the steps. The last arrangement of the tangents is the customary one in practice and in every sense is satisfactory when the curve contains only two or three steps; but when it contains six, as in this case, it is better to lower the pitched tangent from *C′* to *M*, because it follows the nosing of the steps along its length and shortens by 4½ in., as at *P*, the height of easement.

To help out the correspondent I would suggest two solutions, either one of which will produce a wreath that will meet the newel 3½ in. above the nosing line of the step required: One is to make the nosing line without the easement, as shown in Fig. 3, and the other as shown in Fig. 6 with an easement but in two sections.

The one shown in Fig. 3 is the easiest to construct, and when in position would appear quite as satisfactory. Fig. 3 represents the plan, elevation and pitch of the tangents *C′-B′* and *B′-A′′*. The points upon the tangents are developed from the plan. The plan ordinates are made parallel to the plan directing ordinate *A-A′*, which is found by swinging the plan tangent *A-B* to *A′*, and connecting *A* with *A′*.

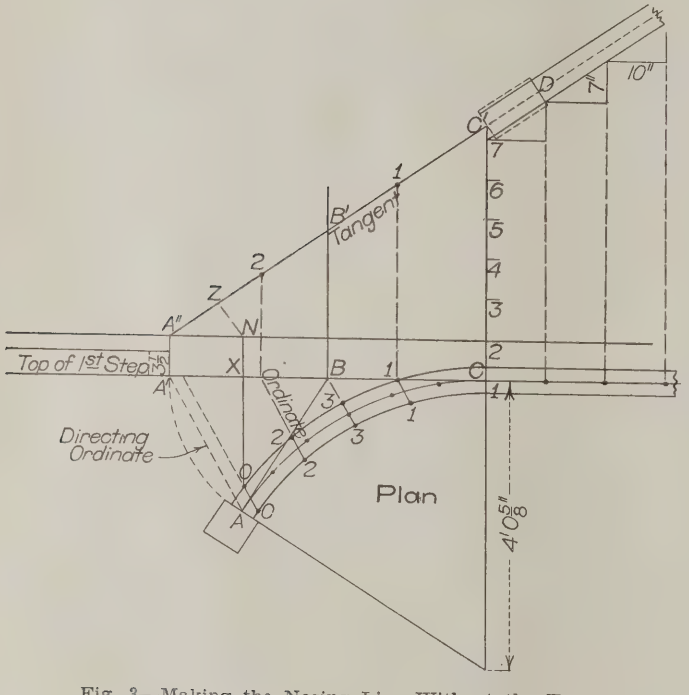


Fig. 3—Making the Nosing Line Without the Easement

In Fig. 4 is shown the simplest method known of laying out the face mold. The level line in this figure and the points upon it represent the pitched tangents as shown in Fig. 3. From the point *Z* draw an indefinite line and from *B′* draw a line the length of the bottom tangent *A′′ B′* of Fig. 3, to cut the line from *Z* in *A* which represents the bottom tangent as it is required upon the face mold. The top tangent will be *B′ C′* and from *C′* to *D* will be the shank shown in Fig. 3 from *C′* to *D*. Make the joints square to the tangents at *A* and *D*.

Find the directing ordinates by connecting *A* with *A′′* and draw all the others parallel to it, as shown, from the points 0-2-*B′* and 1.

Now find the dots 0-2-3-1 on the ordinates by measuring from the tangents the same distances as shown from the plan tangents to corresponding dots upon the plan ordinates.

The face mold may now be completed by tracing through the dots as shown in the diagram.

The bevels to twist the wreath are shown at each end applied reversely. In this case they are called bevels, owing to the tangents being equal.

The manner in which the bevel is found is illustrated in Fig. 5. Make *A-X* equal to *A-X* of Fig. 3 and *X-N* equal to *Z-N* in the same figure. Connect *N* with *A* as shown. The distances between 1 and 2 upon the long edge of the bevel gives the width of the face mold at each end.

In Fig. 6 is shown the plan, elevation and development of the tangents for a wreath made in two sections. From the center *O* of the plan draw a line to *C*, the center of the plan curve and square to it draw the plan tangents *B-C* and *C-D*.

To develop the tangents continue the pitch of the straight rail as shown from *F* to *D′* of the elevation. Fix the height of the bottom level tangent *A′′′-B′′*, as shown, 3½ in. from the top of the first step and connect *B′′* with *D′*. The joint between the two sections is shown at *C′′*. The face molds

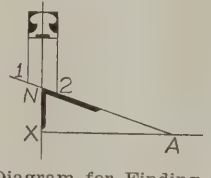


Fig. 5—Diagram for Finding the Bevel

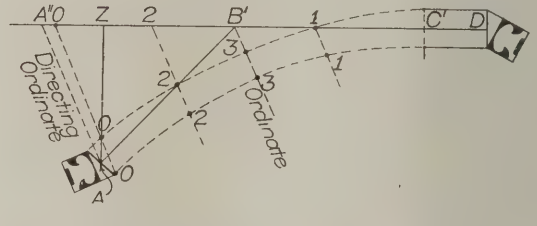


Fig. 4—Simple Method of Laying Out Face Mold

Laying Out Face Mold in Stair Work

are laid out as indicated in Figs. 7 and 8, the curves being drawn by ordinates as in Fig. 4. The face mold for the bottom section of the rail is shown in the diagram, Fig. 7.

The line *C′′ B′′ S-W* is transferred from Fig. 6 as there shown, from *C′′* to *B′′*, the pitched tangent, and beyond to *W*. From *S* in Fig. 7 draw a perpendicular line, as shown, to *A;* revolve *W* to cut it at *A* and connect *A* with *B′′*. This line will be the bottom level tangent as required upon the face mold. The pitched tangent will be from *B′′* to *C′′*. Make the joints square to these tangents.

By reason of the fact that the tangent is level it stands for the directing ordinate. Make the other ordinates parallel to it and upon each one find the dots corresponding to those shown on the plan in Fig. 6, measuring the distances from the tangent *B′′ C′′*.

The bevels are shown applied to each end square

to the joint and directed toward the inside.

The face mold for the top section of the reach is shown in Fig. 8 similarly laid out by ordinates. In this case the line *W-M-D'-E-F* is taken from Fig. 6, as there shown, along the top tangent *E-D'* to *W*. To find the directing ordinate in Fig. 8 drop a line from *M* to *C;* connect *C* with *W* for the directing ordinate and *C* with *D'* for the tangent. Make the other ordinates parallel to *C W* and find the points corresponding with those in the plan and from the points trace the curves.

Figs. 9 and 10 illustrate the appearance of the wreaths after they are twisted by means of the bevels.

The simplest method of finding the bevels is illustrated in Figs. 11 and 12. Make *X-A* of Fig. 11 equal to *X-A* of the plan in Fig. 6. Make *X-S* equal to *X-S* of the elevation in Fig. 6 and *X-R* equal to *X-R* of Fig. 6. Connect *R* and *S* with *A*, as shown, for the bevels.

These two bevels are for the bottom section of the wreath and are shown applied in Figs. 7 and 9.

In Fig. 12 is illustrated the manner in which the bevels are found for the top wreath. Make *V-C* equal to *V-C* of the plan in Fig. 6 and make *V-N* equal to *X-N* of the elevation in Fig. 6. Make *V-M* equal to *X-M* of the elevation in Fig. 6 and connect *N* and *M* with *C* for the bevels. These are shown applied to the face mold in Fig. 8 and to the twisted wreath in Fig. 10.

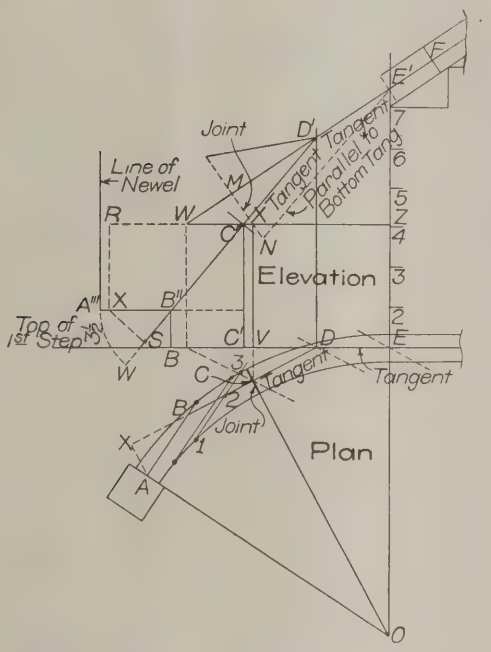


Fig. 6—Making Nosing Line with Easement and in Two Sections

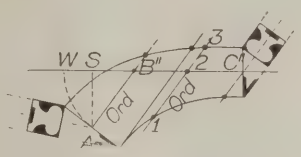


Fig. 7—Face Mold for Bottom Section of the Rail

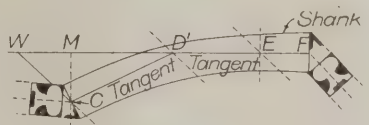


Fig. 8—Face Mold for Top Section of the rail

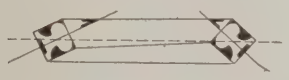


Fig. 9



Figs. 9 and 10—The Wreaths After They Are Twisted

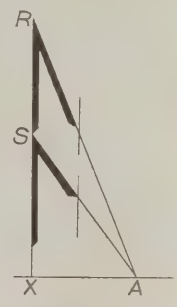
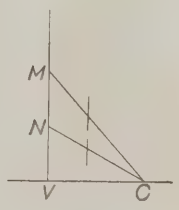


Fig. 11



Figs. 11 and 12—Simple Method of Finding the Various Bevels

Laying Out Face Mold in Stair Work

Another Sumptuous Apartment House

In addition to the apartment houses with costly suites of rooms to which we have already alluded in these columns must be added another which is to be erected on the one-time site of the Progress Club at the northeast corner of Fifth Avenue and Sixty-third Street, New York City, at a total cost of $2,500,000, this including the land which is valued at a trifle less than $1,400,000. The building will be twelve stories in height and is designed to accommodate one family on each floor, the suites consisting of sixteen to twenty rooms and providing a more convenient home than any private residence. A feature of the new structure is that the two first floor suites will be designed as private dwellings with separate entrances. The plans were drawn by Starrett & Van Vleck.

Remodeling a San Francisco Landmark

Extensive alterations are being made in the Claus Spreckels Building, once known as the "Call" Building, at Third and Market Streets, San Francisco, which was for years the tallest building on the Pacific Coast. The most conspicuous change is the removal of massive columns and stonework at the ground floor, which are to give place to store fronts of modern design, so as to give more space for the use of tenants in displaying merchandise. The carved sandstone columns at the entrance have come to be regarded almost as landmarks. The building withstood the earthquake of 1906 with little damage, but the fire made it necessary to refinish the interior throughout, as well as to repair much of the stonework around the windows.

Meeting of Hemlock and Hardwood Manufacturers

A special meeting of the Northern Hemlock and Hardwood Manufacturers' Association was held in Milwaukee, Wis., Dec. 8, for the purpose of considering the adoption of methods in manufacture and grading "which would improve the quality and uniformity of Hemlock shipped from the mills of Wisconsin and northern Michigan." President R. B. Goodman pointed out that the meeting was the first

logical step in the hemlock promotion campaign which was formally undertaken at the previous meeting. He said that in order to make an appeal to the public that would be far reaching and lasting the association must concern itself not only with the intrinsic value of hemlock as a wood but must be able to assure the consumer that it is properly manufactured and graded and that the product delivered to him must fulfill all the claims which have been made for it.

S. Gibson presented a strong report condemning the sale of resawed hemlock unless it is re-graded. J. J. Lingle presented a report on Uniform Manufacture, and W. J. Kessler stated that the term "merchantable hemlock" had become ambiguous in that it was quite generally understood that a merchantable grade of hemlock piece stuff was the natural run of the log with No. 3 out. Uniform methods of selling were discussed as were also market conditions and the advantages of the adoption by the association of the hemlock trade mark.

Building in the Winter Months

With modern construction methods, building work is carried on in almost as great a volume in the winter months as in summer. It is thoroughly proper that this should be so and there is no reason why such construction should not be of the highest standard in every respect. Architects and builders must understand, however, that construction methods must be adapted to the weather conditions and that the methods used in the summer time may produce disastrous results if continued throughout the winter. Certain precautionary measures are necessary to counteract the effect of freezing and these are usually very simply applied.

It is a notable fact that accidents in construction due to cold weather are more frequent in the fall months than in the extreme cold of winter, says a recent issue of *Modern Building*. This is no doubt partly due to the careless workmanship arising from a desire to rush work to completion before the arrival of winter. Also the sudden coming of cold weather has no doubt found the contractor unprepared to meet the new conditions before the damage due to freezing has been done.

But the one great cause for these early construction troubles is the deceptive nature of the weather conditions. In the late fall, although the weather is not extremely cold it is usually hovering near the freezing mark and is always accompanied by great humidity and frosty nights. This atmospheric condition is such that, even though not causing actual freezing of cements or mortars, it greatly retards their setting. In fact, the material may lie chemically dormant for weeks at a time.

The contractor, if he relies on his summer experience, believes that his materials have had sufficient time to properly harden to support their loads and upon removal of temporary false work may have an accident on his hands. He never should take chances in matters of this kind but should convince himself by actual tests that his materials have developed their full strength.

Simple precautions will avoid all troubles. The danger of cold weather lies very largely in the freezing of the materials used in the construction. Therefore the thing to do is to avoid this freezing by heating the materials, by covering the completed work with insulating materials, such as canvas, etc., and by inclosing the building and heating the interior with burning salamanders. The point of the matter is—don't let the materials freeze, and don't remove centering too soon, and there can be no possibility of trouble. If any concrete should have become seriously frozen, by all means remove and replace it even though it may possibly thaw out and reset.

See that the same rigid standards of inspection and workmanship are maintained throughout the cold weather. Under such conditions the building erected in winter will prove of highest quality, sometimes even superior to the summer construction owing to the fact that the contractor may have better workmen at his disposal.

Two New Factory Buildings

A three-story and basement reinforced concrete factory building with roof covered with felt and slag is being erected at Baldwin Avenue and High Street, Jersey City, N. J., in accordance with plans and specifications by Francisco & Jacobus of New York City. The main building will cover a ground area 40 x 179 ft. with a wing 40 x 60 ft. The contract has been awarded to the John W. Ferguson Company, New York City. The same concern also has the contract for a manufacturing building at Shadyside, N. J., the walls being of brick and the floors of concrete and steel beam floor frames set directly into the walls. The building will be 54 x 55 ft. and two stories in height. A tower 20 ft. square will rise from one corner 30 ft. above the main building.

How to Shingle a Roof

If you want a roof that is a roof in every sense of the word, writes G. M. Keepauver in the *American Lumberman*, place your rafters 2 ft. on centers of 2 x 4 or 2 x 6, depending on the length to be spanned. Sheath with a good grade of 1 x 6 s2s; nail with common 8d galvanized wire nails.

Use a premium red cedar 5 to 2 shingle, clear and vertical grain; start at the bottom of the roof with a double course, line or use a straight edge every 4 or 4½ in., this being the amount showing to the weather. Split all shingles of extra width. Do not nail closer than 6 in. to the bottom of each course, nor closer than 1 in. to the edge of each shingle. Break joints not less than 1 in. Never have the roof flatter than one-third pitch; steeper will last much longer. Have the shingles moistened before laying to prevent cupping and warping.

Do not crowd them too closely, as this is a hindrance instead of a benefit. Use the old style cut, the triple galvanized or zinc-coated nail. Past records have proven beyond doubt that this type of a roof is the cheapest and most lasting. It will resist heat and cold and all of the other elements better than any other roof known to-day.

"How did you come out on the $3,000 house you contracted for?"

"Came out in pretty fair shape. The contractor spent my $3,000 and took the house for the difference."—*Louisville Courier-Journal.*

CORRESPONDENCE

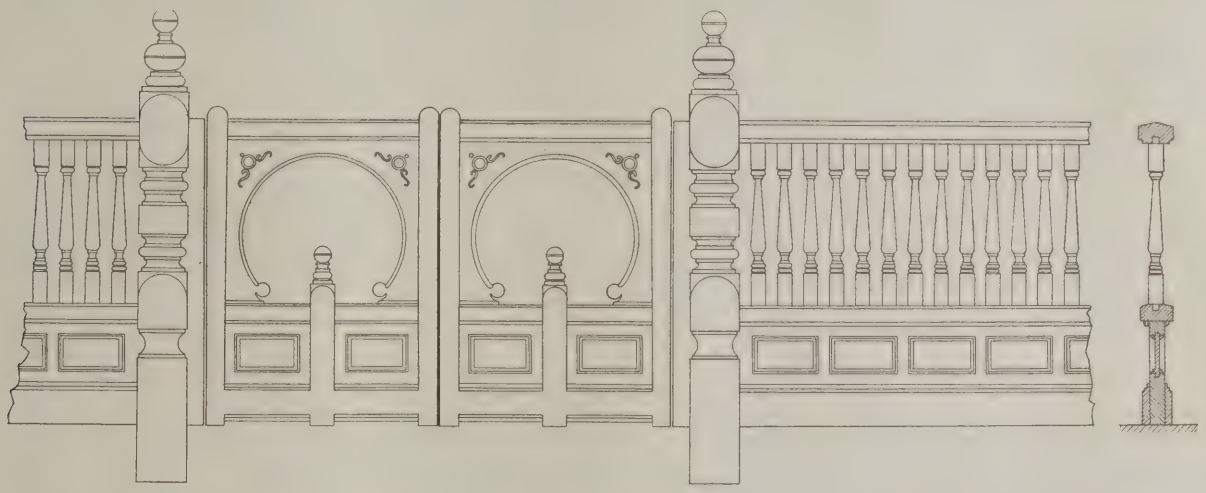
A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Design for Fence and Gateway

From Builder, Moffittsville, N. Y.—With regard to the query of "W. M. L.," Orange, N. J., I would say that the best material to use in building such a fence is cypress. All the joints and laps should be primed with crude petroleum, and, if painted, crude oil should be used in the first coat. If the wood is oiled I would suggest crude oil be used for the filler. The next most durable and workable material is cedar, and then comes white pine. If the latter material is used, every piece should be primed before putting in, after fitting.

The bottom ends of the posts should be left the full size of the log, charred ¼ in. deep and set in cobblestones well tamped in. No dirt should be placed around the posts. The stone may be covered with hard, dry wood ashes. The hole should be 3½ ft. deep and small stones put in the bottom to furnish drainage.

If desired the posts may be thoroughly soaked in hot asphaltum or tar and set in concrete mixed with 10 per cent Maltha. If the ground is clay or heaves, the posts should be anchored.



Design for Fence and Gateway—Scale ½ In. to the Foot—Contributed by "Builder," Moffitsville, N. Y.

Remedy for Damp Cellar

From L. N. Whitcraft, Chief Engineer, Pittsburgh, Pa.—In the November issue of THE BUILDING AGE, page 59, I notice three letters relative to a "Remedy for a Damp Cellar," giving therein as many different remedies for overcoming or preventing this undesirable condition. In this connection I would like to suggest, for the benefit of your numerous readers, and especially for those contemplating building cellars, or any concrete structure which they desire to be both damp proof and waterproof, that the addition of 10 per cent of hydrated lime, by weight of cement, will successfully damp proof and waterproof any concrete work, even under pressure conditions.

Hydrated lime is the most economical, efficient, and permanent medium that can be employed for waterproofing concrete. Due to its extremely fine state of subdivision it fills the voids and results in a dense, impermeable concrete, retaining its power of imparting impermeability to the concrete as long as the structure lasts. While the value of hydrated lime as a waterproofing material has never been widely advertised, and is not as generally known as it deserves, it has, however, been used for this purpose in a great number of cases, including some very important structures and, so far as recorded, success has always attended its use.

Mr. Barry Replies to His Critics on Roof Framing

From D. P. Barry, Redford, N. Y.—I have read the strictures of "G. L. McM." in the November issue, and when I finished I could not restrain the observation of the devil when he was shearing a hog: "Much squeal and little wool." I did not say to put a work line on any rafter, but to put it on a pattern, which should be made of inch material and save for use another day. Some writers call this a "template." No such work line as the correspondent mentions was ever used here to my knowledge, and frame buildings were built in this place about as early as elsewhere in the United States. No rafter that I have seen has any

other line than the hew line. Most frames have no projection on the rafters, and when they have they are put on as shown in a former issue—the top of rafter being flush with outside corner of plate. The work line is used in framing to avoid working off superfluous timber, for hewed as well as sawed timber greatly varies. In one of the barns on my place, built probably seventy-five years ago, some brace seats are 1¼ in. deep.

No rafter is hypothetical. If any such rafter exists it cannot be other than real. In spite of everything on the steel square, that method is prone to error. Then, again, the framing squares have errors, and the lengths on them must be computed by square root or trigonometry. Furthermore, I have been a teacher for many years, and in teaching we go to the original documents, and I am trying to prepare young men to be independent of steel squares and books.

I insist that every complicated roof should be worked out before it is built. I do not have patience or time to use one stick to get the length of a rafter and another to mark the bevels. One would seem to be entirely adequate for the purpose.

A word more as to backing. Unless the hips are backed and the valleys grooved and the hips grooved on the under side the facia at those points will be too narrow. Now, to overcome this a few builders cut the cornice bearer of these rafters narrower by a sort of guess, which makes the lower end too low and the rafters too long.

If "McM." worked in these parts he would see rafters grooved and backed. A joint cannot be made for rafter finish unless the valley is grooved. Back the hips neatly and get them straight, and groove the under side of projection and put up a decent roof. What's the use of knowing mathematics if they are not going to be used? Some day when somebody takes down your roof, what will he say?

Criticism of Barn Roof Construction

From Builder, Redford, N. Y.—Regarding the barn construction of L. H. B. H., Palestine, Ill., I do not think his Fig. 1 worth considering. It may stay up in Illinois, but it would not in this place. It is not self-supporting; the only thing that contributes to self-support is the little piece at the peak; the tension pieces at the foot are all that keep it from collapsing. A self-supporting roof is one that has no horizontal thrust, and neither of his roofs is such.

His Fig. 2 is the best illustration of a craze that I know of. It is loaded down with superfluous lumber to give it the curb roof effect. Gambrel barn roofs are objectionable on two grounds—they take a lot of lumber and they become filthy with litter hanging to the labyrinth of members. I would say that rafters 2 in. by 6 in. and 24 in. on centers will hold up a 28-ft. span in this section of heavy snow. In this region 30 ft. x 40 ft. is the standard barn, and not half of them has a ridge pole or purlins.

I went to examine the biggest frame building now standing in this place, which is over 40 ft. x 60 ft., with 22-ft. posts. The roof is about one-quarter pitch, the rafters are 4 x 7 in. sawed and the ridge pole is an inch board. Part of the roof has collar beams, but no purlins. The rafters are 3 ft. on centers and, of course, they had sagged some. The rafters start from the edge of the plate, the roofing board projects about 2 in. and the shingles 3 in. This was built for a hotel in 1832, and it is a magnificent piece of framing.

If this roof stands here what is the sense of loading down a 28-ft. span and a 12-ft. post?

A heavy ridge pole not supported by king posts is a danger. The purlins should be set up with their sides plumb and level and the purlin supported on vertical posts. The 2 x 6's at the plate should be thrown out and rods put in. We never use them here, but would have saved some barns and stock one year when the hard snow on the roof was higher than the men's heads shoveling it off.

Views of Veteran Reader of The Building Age

From W. H. Blair, Architect, Janesville, Wis.—In moments of relaxation it is refreshing to turn to files of The Building Age, where we find interchange of thought by men of kindred minds and experience, which gives a sense of fellowship seldom found elsewhere.

I began the building business some time after the three gentlemen whose pictures appear in the right-hand column, on page 36, of the March number of this year, retired, and I have been continually connected with building operations in some capacity ever since.

I have had to scratch my head many times over the problems which constantly arise, but this I have lived through and still have at least as much hair left on top of my head as the gentleman on the right, on page 49 of the above issue.

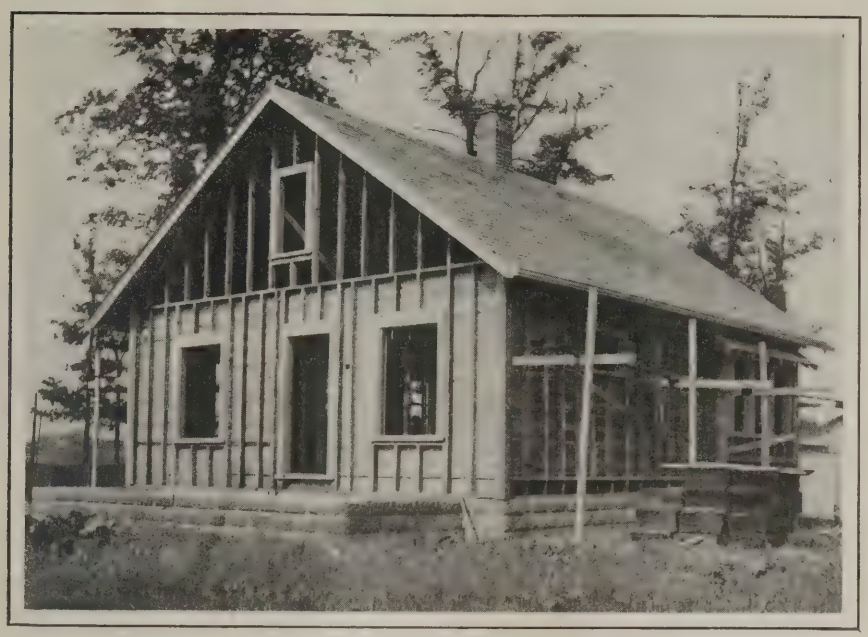
I have read each issue, more or less closely, beginning with the January, 1879, number, and have found many valuable suggestions. In recent issues it appears that many are having their troubles with flour bins, but I got away from most of my troubles in that line, by adopting antifriction drawer slides, which give better satisfaction in working and more economy of space.

Methods of Cottage Construction

From James F. Hobart, Indianapolis, Ind.—In my recent journeyings I could not help but notice certain methods of doing work which differed so radically from eastern practice that it may not be without interest to briefly refer to them. In connection with the balloon frame cottage, Fig. 1, there was not a sign of siding about the job, neither was there a scrap of lumber save the shingles shown in the picture, together with the partial stagings. The floor was laid and the walls sheathed inside with boards ½-in. thick which had been run with dovetail grooves about 2 in. apart to receive and hold the plaster. The roof was complete, the door and window frames were set, and it appealed to me very strongly that here was a job which was to be covered with metal lath and stucco after the fashion somewhat prevalent in this vicinity. I marked down the location of the frame and promised myself to go back later

and secure a picture of the cottage after the stucco had been applied. In the course of time I did go back, but there was no stucco. The cottage had been finished with shiplap siding cut from Oregon fir logs.

In the completed cottage shown in Fig. 2, several characteristics are noticeable. There was no attempt made on the front of the house to bring the siding even with the lower edge of any window stool, but this was done on the side. The siding seems to have been run on both side and end on a predetermined spacing, taking no account of top of piazza floor or top of piazza roof. Neither was the bottom of the overhanging bay window considered.



Methods of Cottage Construction—Fig. 1—Building Ready for Its Outside Covering

It seems as though this window could have been dropped far enough or at least furred down far enough to bring it even with a course of siding, for the bottom of the window splits one course and another course is split in order to bring the courses of siding to an even break around the window. Two courses of siding are also split on the front of the bay window.

Another case of what I regard as slack designing or lack thereof is evidenced by the very short pieces of siding at either side of the mullioned window sash. It would seem as if the bay could have been made a little wider to give full window casings and a fair width of siding or else dispense with the casings and allow wide corner boards to take the place of the narrow casings.

The picture also shows a neat looking oval vent hole below and to the left of the bay window. The manner of placing the cornice gutters and the amount of drop given to them is plainly visible in the picture. Very long O. G. goosenecks are used to connect the eave troughs and the down spouts. These may serve in Indiana, but they would be pretty well frozen solid many times were they to be used in latitudes a little farther North, where the winters are a joke compared with New York and Massachusetts winters. There will undoubtedly be a whole lot of freezing stoppage when water will spill over the gutters instead of running away to the sewer. I would rather such connections be made on some other house than on mine.

Referring again to Fig. 1, the picture shows the amazing cheapness of construction of the cottage and gives a hint as to how hot the interior is likely to be in summer and how cold in winter. The walls are plastered inside and ½ in. of grooved boards behind the plaster with a thickness of ¼ in. of siding on the outside of the studding and no building paper between certainly does not promise much warmth in cold weather or much heat-repelling capacity in summer.

The placing of the window and door frames to receive the siding is, however, rather ingenious. The siding is so placed that the door and window frame can just slip inside of them, and then the double studs nailed on receive the frames and permit the casings to be nailed thereto. The threshold of the front door is left entirely free from all supports save for the rebates in the jambs, but when the piazza floor was "poured" the concrete was tamped under the threshold until the cavity there shown was completely filled, thus making sure of a thorough support for that portion of the door.



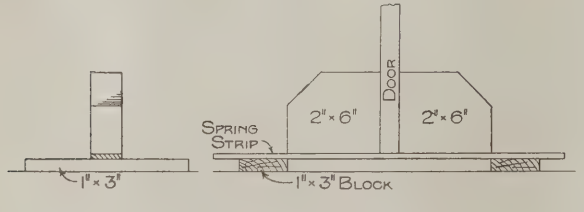
Fig. 2—The Cottage as It Looked When Completed

Fitting and Hanging Doors

From G. L. McM., Tacoma, Wash.—I have read with much interest the article of Mr. Hobart in the November issue of the paper describing the way too many carpenters fit and hang doors. I am quite pleased with his "jig" or template for saving considerable of the unnecessary labor he describes, but out in this "neck of the woods" where the tendency is to reduce to its lowest terms the amount of tools the journeyman takes with him on the job, and where such a thing as a contractor furnishing transportation for tools from one job to another is one of the "lost arts"—the common practice being for the journeyman to take his tools in a "suitcase" hand box, the means of transportation being the street cars, a bicycle or the journeyman's shoulder —I am afraid such a tool would find little sale.

It would undoubtedly be a very convenient and labor-saving device if only the contractor would furnish it, but there would need to be a very radical change of attitude here before that would come to pass. Extra appliances for doing special work do not find a very ready acceptance in this part of the country for the above reasons, as they add materially to the load the workman must carry with him from one job to another.

Fortunately, however, it is possible for one to fit and hang doors without either the unnecessary



Fitting and Hanging Doors

and frequent lifting and trying so graphically described by Mr. Hobart, or burdening oneself with extra appliances like his "jig" though one would be pleased to have it to use. All the extra appliances necessary for the rapid and easy fitting of doors can be easily made or found on any job, while at the same time they cost nothing and after being utilized can be thrown away.

Aside from the usual tools found in every workman's hand box, the appliances are a pair of trestles—the lighter the better—a straight-edge the length of the door, a floor clamp for holding the door while jointing it, and a slide rule of some kind or a couple of narrow strips of wood for measuring rods, with which to take the widths of the door frames and transfer them to the door.

Of the slide rule there are several patterns to be found in the hardware stores. One of the most convenient tools I have ever found for this purpose is a 2-ft. one-fold rule with a slide in one side. This combines both rule and measuring gage, the only objection to it being that it requires a special pocket in which to carry it. I had mine made on the outside of the left thigh.

I am sending a sketch of the most convenient floor clamp with which I am familiar for holding doors while jointing them. Side and end views are shown which would seem to be self-explanatory. The clamp can be made by nailing 2 x 6-in. blocks on a thin strip of lath by cutting a notch nearly through a longer piece of 2 x 6, or the workman who wants something better than the ordinary can use a steel spring and screw hardwood blocks to it, in which case one end should be slotted so that the blocks can be adjusted for different thicknesses of doors.

Having accumulated the necessary appliances, place the door in the clamp and joint the hinge side, testing the hinge jamb with the straight-edge and making the necessary allowances for variations from a straight line in the jamb by the use of the straight-edge while jointing the door. This is where the principal utility of the straight-edge comes in, as with very little practice one can readily fit the sides of the door to any ordinary jamb with the use of the straight-edge, before the door is ever lifted to place in the frame. The hinge edge of the door should be jointed with a barely perceptible bevel, to prevent its being hinge-bound when hung.

Having jointed the one edge place the door on the trestles, take the measures of the width of the frame both top and bottom and transfer them to the door, making the proper allowance for clearance at the same time; then with the aid of the steel square the proper cut for the top of the door can be found and the door cut accordingly. When there are to be no thresholds the bottom of the door can often be cut to the proper clearance from the floor while the door is still on the trestles, but sometimes it may be better to leave this till the door is hinged. Then the door can be replaced in the clamp and the other edge be jointed to the right width and to correspond to the jamb. If the work is done with care it will be found that it can be done more rapidly, with less lifting, and fully as good a fit can be made as when it is continually lifted, scribed and tried. In most cases with ordinary doors the door will be found to fit at the first trial and can be wedged to the proper height in the frame and the position of the hinges marked on both door and jamb at the same time, and the door is ready for hingeing with only one lifting to place. The lock edge of the door will need to be bevelled from ⅛ in. for 1½-in. doors to 3/16 in. or ¼ in. for 2¼-in. doors.

I find it better to use the steel square for squaring and bevelling the edges, as in many cases the stiles are not true with the width of the door and a smaller square will not give the right angle, as the angle should be with the whole face of the door and not with the stile alone.

Sometimes there is considerable surplus wood to be removed from the width of the door; too much to allow of its all being taken off one side alone, in which case it may be necessary to place the door on the trestles and mark the widths before jointing either edge.

Hanging and fitting doors is hard work, though many, myself included, like to do it as well or better than any other work on the building, and the above method which saves a large percentage of the lifting that many do makes it very much more pleasant work to perform. In most cases it will only be necessary to lift the door into place in the frame twice—once to see that it fits and to mark for the hinges, and once to put it on the hinges.

Evidences of the growing prosperity are reported by architects in the larger interest which is being manifested in country homes.



Wall Board The Interior Finishing Material

Some Reference to Its Merits and Reasons Why Many Builders Prefer It for Interior Finish to Lath and Plaster

By Joseph A. Poesl

THERE are two good reasons why so many builders use wall board to finish the interiors of most of the buildings they erect. One is the certainty of thereby pleasing the owner, and the other is the added convenience and greater profit in having the entire job under direct control, which it permits.

Apparently, the better this material becomes known the better it is liked, for within the last few years it has made unprecedented strides in winning the indorsement of the building fraternity. And why not?

The manufacture of wall board has progressed to a remarkable extent during this period. Through earnest research and tireless experimentation a number of improvements have been applied so that the wall board of to-day is much different from that of yesterday. To-day it is a standard building material favored by leading carpenters and builders throughout the length and breadth of the land.

The most important improvement made is sizing the board. That is, the board is thoroughly impregnated with a special chemical compound which renders it moisture-proof. This idea is not new, but not until a short time ago was a size produced that would keep out moisture and act as a priming coat as well. Some of the best known moisture-proofing agents, like paraffine, had to be rejected by the experts in their search for this size because of the extreme difficulty of painting over it. As it is wall board can be easily painted. Doing away with the necessity of the priming coat saves money in decorating—actually a matter of at least $5 on every thousand square feet.

This leads to the much discussed question, "Is wall board really better than lath and plaster?" The answer of "yes," is not based on theory alone but on actual tests and on the experience of users. Yet, it must not be said that wall board is absolutely free from certain limitations, although its advantages outweigh them, and lath and plaster possesses undesirable features also.

Wall board is considerably cleaner to handle; in fact it may be compared with high grade lumber in this respect. A fine-toothed saw cuts it with a straight, smooth edge. The board is fastened direct to the studding, joists and headers with nails. And just as soon as this is done the decoration may proceed, and the job completed weeks earlier than if lath and plaster were used.

After the decoration has been completed battens or decorative strips are placed over the joints,



The Scheme of Letting the Band Answer for the Door and Window Heads, and the Beam Ceiling Are Interesting Features of the Attractive Living Room Shown in this Picture

bringing about a panel effect. Some home-owners object to paneling because ordinarily they are unfamiliar with the wide possibilities of this method of treating interiors and, as a result, are quickly won over. It is truly one of the most effective means of relieving the uninteresting plainness of a wall or ceiling. A plastered wall is nearly always covered with wall paper or paint, which only partly serves this purpose. The unlimited variety of panel effects that can be worked out with wall board permits of a particular treatment for each room, yet they may be totally unlike those of the adjoining rooms. In this way monotony is avoided.

The two rooms shown in the small pictures are in the same house. The one at the right is finished with wall board while the other had lath and plaster walls and ceiling. It is alleged that striking bridge-workers dynamited a nearby viaduct with the result that the lath and plaster came down; the wall board held fast and only a repainting was needed to put the room into shape again. Yet, the wall board room was but eight feet from the explosion and the other room was forty feet away.

With reference to the cost of wall board, this runs about the same as that of lath and plaster. There are, however, certain sections of the country where it is more expensive; in others, especially where transportation facilities are poor and skilled labor scarce, it is much less. But, taken all in all, both coverings average about the same as stated.

While speaking of cost, it is unfortunate that most people are governed by the first cost of an article in dollars and cents and not by the actual value received. In wall board is obtained a material which makes permanent, substantial and beautiful interiors—interiors that will never have cracked walls ready to fall at the wrong moment. The upkeep expense is practically nothing, and it follows that the first cost is the only cost. In addition, rooms finished with it have wholesome and sanitary walls and ceilings. When oil paint is used for the decoration the surface can be quickly cleansed with a damp cloth, making an almost ideal interior finish.

Perhaps it is not generally known that a newly plastered house is dangerous from the standpoint of health. It may be that on account of this ignorance many houses are tenanted about as soon as completed, but wall board requires no drying so a house may be occupied as soon as it is on the wall.

Other good points about wall board are its heat and cold retarding qualities. The peculiar way of building it up, layer upon layer, is conducive of this, which means that a wall board room is cool in summer, and cozy and warm in winter.

Inasmuch as the basis of nearly all wall board is wood pulp it does not take fire readily. The fact is that it has never been known to take a higher insurance than lath and plaster.

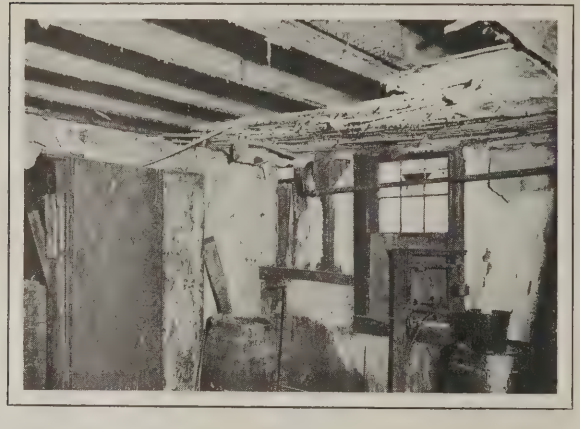
It is proof against vermin. The special adhesive employed to hold the layers together and produce an almost homogeneous mass, is repellent to household pests such as rats, mice and the like.

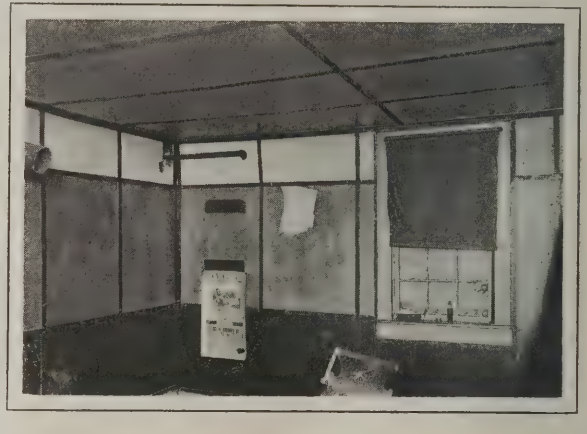
The decoration of wall board is similar to that of wood and having a slightly pebbled surface it produces a more artistic effect. With sized board a good finish is readily secured with only one coat of the darker shades of oil paint and two of the lighter. However, water paint, tiffany glazing, dry fresco—practically any form of decoration is possible on it. The ability of the decorator is the only limit. It lends itself well to stencil decoration and to the aesthetic skill of the free-hand artist.

It is noteworthy that the wall board idea originated because of the insistent demand for something that would do away with the delay, dirt, muss and general inconvenience incident to lath and plaster work, especially for remodeling. For this reason it appeals to the home-owner who contemplates refixing or repairing. With it defective plastered rooms are quickly made new and attractive by simply applying it directly over the walls and ceiling. At small cost attics are transformed into habitable rooms, thus utilizing what is often considered waste space in a house. In the vault-like cellar neat, dry and clean fruit-rooms, laundrys and workshops are erected with very little trouble. There is also the old barn or outbuilding that is remodeled into a fine garage or studio.

We must not overlook the uses of wall board tile. In the kitchen and bath room it is ideal for wainscots, bringing about, when properly enameled, the effect of tile which is hard to detect from the genuine article. Besides it has the advantage of never cracking or disintegrating.

Then there is the grained wall board which is worthy of our attention. The process of faithfully reproducing the grain effect of wood on the surface of the board has reached a high stage of perfection. It is popular for use instead of solid wood or veneer wainscoting or other form of wood paneling.





WALL BOARD, THE INTERIOR FINISHING MATERIAL—EFFECT OF AN OUTSIDE EXPLOSION UPON THE INTERIOR OF TWO ROOMS—ONE FINISHED WITH LATH AND PLASTER AND THE OTHER WITH WALL BOARD

Making Concrete Posts for Mail Boxes

One of the Very Many Uses for Which Concrete Is Well Adapted—Proportions of the Mixture

By Percy H. Wilson

A RATHER novel but at the same time thoroughly practical use of concrete is shown in the half tone engraving presented herewith. It is a post supporting a mail box on a rural free delivery route near the city of Dallas, Tex. It is a well known fact that wooden posts are always subject to rapid decay at the ground level where alternate wetting and drying takes place, and to avoid the necessity of renewals and repairs the concrete post was made. It is quite ornamental in design, and conveys the impression that the owner takes pride in the appearance of his premises.

A more simple post, one easier to make, would effect the same economy. The "form" for casting a post of this kind is shown in Fig. 1. The post should be about 7 ft. long. Planted at a depth of 3 ft. this would leave the box at convenient height for the delivery or extraction of mail. The form, as shown on the drawing, is simply a three-sided box

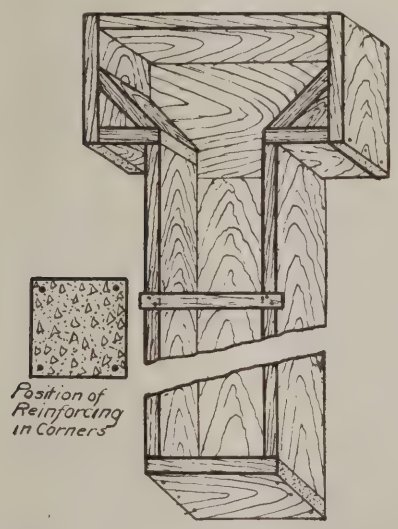


Fig. 1—"Form" for Casting a Concrete Post Similar to that Shown in Fig. 2



Fig. 2—General View of a Concrete Post for a Mail Box

Making Concrete Posts for Mail Boxes

providing for a post 6 in. square. The "form" is placed on the ground in horizontal position, with open side up, and filled with well-tamped concrete to the depth of about 1 in. Then ⅜-in. reinforcing rods are placed at either side, leaving about 1 in. space between each rod and the side of the "form." The box is then filled to within 1 in. from the top and two more reinforcing rods are placed on the concrete. The "form" is then filled to the top and the concrete struck off. The rods may go straight from the bottom to the top of the post, as it will not be necessary to curve them outward at the bracket.

The "form" or mold may be made with one or more braces nailed across the upper or open side to prevent the sides from spreading when the concrete is tamped. The bracket effect at the top is obtained by inserting extra pieces of wood at the corners, as shown. If preferable a post in the shape of a letter T may be made, eliminating the bracket feature. A perfectly plain post without projecting top would also answer the purpose.

To provide for fastening the mail box to the post, bore two or perhaps four holes through the board at the top of the form. Insert in these holes the bolts with the heads down, or inside the "form." The bolts will be imbedded in the concrete when it is placed and when the "form" is removed the threaded ends of the bolts will project slightly above the top of the post. Holes cut in corresponding position in the bottom of the mail box will permit the bolts to pass through and the box will be secure when nuts are placed on the bolts.

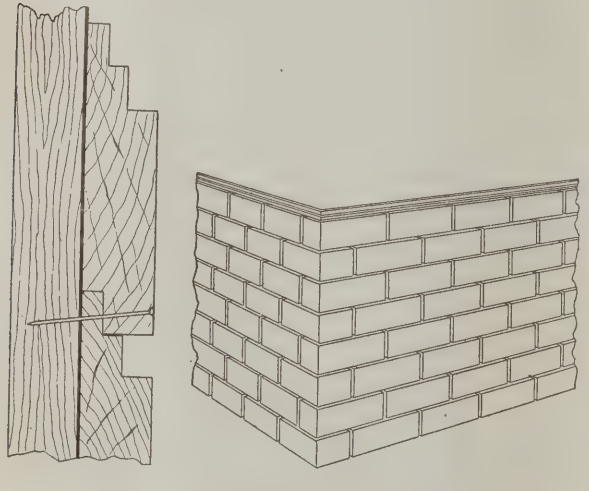
Mix the concrete in the proportion of 1 part Portland cement, 2 parts sharp, clean sand and 4 parts crushed stone, ranging from ½ in. to 1 in. in size. Allow the concrete to remain in the

"forms" for at least 24 hours. When the post is removed protect it from freezing, or if made in summer, from hot winds and sun. Wet it thoroughly for a week or ten days after removing it from the "forms."

Concrete posts do not warp, decay or burn. When used for fencing they keep in better alignment than wooden posts. Concrete is now used for fence posts, clothes poles, hitching posts and gate posts. Concrete fence posts have been made at an average cost of less than 25 cents each, notwithstanding the fact that all material was purchased, and even in well-timbered districts they are being substituted for wooden posts on account of their low first cost and everlasting qualities.

A New Idea in Weatherboarding

Originally the siding or outside covering on a house was called weatherboarding, and was really a clapboard proposition. Later it became beveled siding, with the development of saw and planing mills; then in time came the manufacture of quite a series of patterns in what was termed drop-siding, the use of a standard thickness of 1-in. lumber, dressed on the outside and shaped to pattern varying from that of the old beveled siding in appearance. The last offering in the weatherboarding class, says T. C. James in the *Wood Worker*, is a standard thickness, comparatively narrow strip of lumber, dressed on the inside instead of the outside, shiplapped at the joints and grooved lengthwise and crosswise, so that the finished wall is in imitation of brick in outline.



A New Idea in Weather-boarding—Elevation and Section of Wall

The machine wood-working involved in this stock is that of milling it through a planer to get the shiplap and the lengthwise groove, all of which is made at the same time; meantime the strip is sized to ¾-in. thick by dressing the inside. The outside is left rough, to present a better rustic appearance and make a closer imitation of brick. After the shiplap is milled the strip is passed through a gang gainer which cuts cross-grooves ½-in. wide and 5/16-in. deep, which take the place of the end mortar joints in a brick wall.

This class of siding is put up with miter joints at the corner. The end jointing is practically all done in the cross-groove, so that short pieces may be used without the end joints showing much. In laying it up it is of course arranged to have the cross-groove break joints, as in the laying up of brick in a wall. The usual method of finishing off this class of work is to paint the wall face a brick red, then paint the groove which imitates the mortar joint, black. A sheet metal stencil or brush guide fits snugly into the groove and makes it easily practical to paint the groove rapidly and without smearing the outer surface with paint.

The Complete Building Show

One of the important coming events of deep interest to builders throughout the country, and especially to those in the Central West, is the exhibit of building materials which is to be held in the Coliseum in the city of Cleveland, Feb. 16 to 26. It is under the auspices of the Society Advocating Fire Elimination and will be a most powerful appeal to the American builder in the interest of safety, beauty, comfort and economy in construction, equipment and adornment that has probably ever been held in the United States. It will combine the best that formerly have contributed to the Cement, Clay, Real Estate and Building Shows of the country. It will be known as the "Complete Building Show" and will be patterned after the well known Building Trades Exposition of London.

A distinct feature will be the architectural exhibit in which will be shown drawings submitted in the contest that is to be held by the Directors of the Exposition. This will afford opportunity for the display of the plans and specifications of a building together with the construction which these plans and specifications cover and of the completed structure. The contest will be for a six-room workingman's home to cost not more than $3,000.

Detailed particulars regarding this exposition are obtainable through the general secretary of the society, Ralph P. Stoddard, 356 *Leader-News* Building, Cleveland, Ohio.

Babson on the Building Outlook

In the last report of Babson's Statistical Bureau, the following regarding the building situation appears in the column headed "The Mercantile Outlook."

"New building is now making an exceptionally good showing. Contrary to the usual movement at this season construction projects have not shown much tendency to decrease. So far this year the greatest proportional advance has been made in factory building which has increased to fully six times its volume last spring. After a winter of good business with big profits, however, a great expansion in residential building is almost inevitable and in actual dollars and cents this class of construction is by far the largest. Moreover, the railroads may soon undertake considerable new construction. Surely, a wonderful, perhaps a record-breaking, building boom should take place next spring."

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

COMPOUND beams have been made consisting of two shallow beams superimposed (Fig. 52). If not carefully fastened together they act singly because the line between them is in the position occupied by the neutral axis of a solid beam, having a depth equal to the combined depth of the two pieces. Several methods have been used to cause the two pieces to act together, one of which is shown in Fig. 52, the other in Fig. 53.

No matter how thoroughly the pieces are fastened together the strength of such a compound beam is only about 70 to 75 per cent of the strength of a beam of equal dimensions made from one piece of timber. The deflection of such a beam under load is much greater than the deflection of a beam of equal dimensions made from one piece of timber.

The diagonal side pieces shown in Fig. 52 should be preferably of a harder wood than the beam, and each should be not less than one-eighth the thickness where a pin is placed by the allowable bearing times the breadth to obtain the depth of the hole, half of which will be cut in each half of the beam. The shear divided by the breadth times the allowable unit shear with the grain gives the minimum distance allowable between pins. When the computations are completed it will be discovered that the pins get farther apart as the middle of the span is approached.

Flitch plate girders, Fig. 54, are seldom used to-day, although very popular at one time. The only reason for referring to this type of compound girder here is to show wherein it fails. A flitched girder consists of a plate of steel, or wrought iron, between two planks, the whole construction being firmly bolted together. The writer, in wrecking old buildings, found a number of such beams evidently put together on a basis of relative fiber stresses with no thought for relative deflections. He worked once

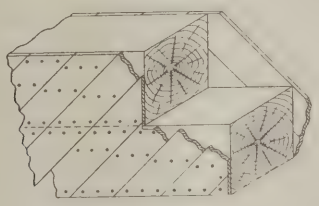


Fig. 52—Compound Beams



Fig. 53—Another Style of Compound Girder



Fig. 54—End View of Flitch Plate Girder

of the beam, thus making a beam 25 per cent wider than the width of the pieces of which it is composed. The pieces should be diagonal and slope in opposite directions on the sides of the beam. Plenty of nails must be used.

In Fig. 53 the pins should be of hard wood or of metal. It is best to use two pieces in each hole, wedge shaped so they may be driven tight and have a bearing against the wood the full width of the beam. The shear being greatest along the neutral axis it is here the pieces should join and the pins be driven. Between the pins should be vertical bolts with large washers to hold the pieces together. The spacing of the pins will be determined in like manner as the pitch of nails is determined when reinforcing planks are used on the side. First determine the bearing value of the wood and the shearing value with the grain. Divide the shear in the office of an architect who tried to get him to design such a beam in this way and the man was greatly surprised when the proper method was shown him. The method not to use is as follows: Assuming a maximum bending fiber stress of 1300 lb. per square inch for wood and 16,000 lb. per square inch for steel, the relative areas of wood and steel will be $16{,}000 \div 1300 = 12.5$, or a ¼-in. steel plate between two ⅞-in. planks makes a girder having the strength of four ⅞-in. planks.

Referring to the deflection formulas it is seen that for a fiber stress of 16,000 lb. in steel the deflection in inches on any span $= \frac{L^2}{60h}$, while for a fiber stress of 1300 lb. in wood the deflection $= \frac{L^2}{41h}$

Therefore yellow pine deflects $60 \div 41 = 1.46$ times as much as steel, under the respective fiber stresses given. This question of deflection does not take into consideration the thickness of the material, for deflection is governed by the span and the depth.

The statement about relative deflections means that if the thicknesses are proportioned by the relative stresses then the wood planks must be 1.46

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 51 of the December issue for 1915.

times as deep as the steel plate between them. This will not do in practice, so it is necessary to obtain the relation between the stresses when the plate has a depth equal to the depth of the inclosing planks. The fiber stress in the wood divided by the fiber stress in the steel must equal the modulus of elasticity of the wood divided by the modulus of elasticity of the steel; that is,

$$\frac{f_w}{f_s} = \frac{E_w}{E_s}$$

Then $f_w = \frac{f_s E_w}{E_s} = \frac{16{,}000 \times 1{,}500{,}000}{30{,}000{,}000} = 800$ lb. per square inch.

This is a low stress for yellow pine, so a softer wood can be used. Assume a wood having a modulus of elasticity of 1,000,000, then

$$f_w = \frac{16{,}000 \times 1{,}000{,}000}{30{,}000{,}000} = 535 \text{ lb. per square inch.}$$

If a steel fiber stress of 18,000 lb. per square inch is assumed the fiber stress in the wood = 600 lb. per square inch. The computations show that for

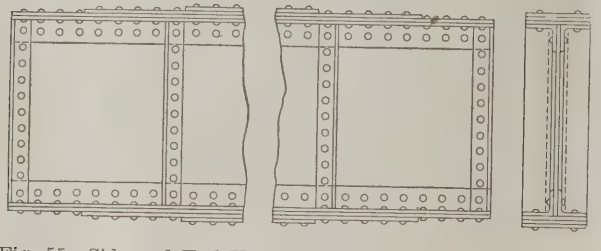


Fig. 55—Side and End Views of Plate Girder with Stiffeners

Design of Beams, Girders and Trusses

a flitch plate beam a soft, cheap wood is the kind to use. It is wasteful to use a wood in which a high fiber stress may be permitted.

To design a flitched girder the fiber stresses are first found. Then assume the depth and thickness of the steel plate. Find how much it will carry as a thin deep beam and deduct this load from the total load to be carried. The difference is to be carried by the two wood planks of which we know the depth and the fiber stress, so it is easy to find the thickness. The bolts are figured to transmit the shear. It is an interesting exercise to design a flitch girder, but a rolled steel beam or a trussed wooden girder will usually be cheaper.

Plate Girders

Plate girders are compound girders made of wrought iron or steel, the latter material being generally used to-day, for it may be used with a higher fiber stress, thereby reducing the weight. When rolled beams are not obtainable in a large enough size a plate girder is used, provided a rolled beam cannot be made to serve, by attaching plates to the flanges. Tables of plate girders are given in the steel hand books, so the architect or builder finds it as easy to select a plate girder for much of his work as it is to select a rolled I-beam or channel for light loads on shorter spans. When the load, or the span, either or both, make a plate girder too heavy a trussed girder is used.

Fig. 55 shows a plate girder. The thin vertical plate is known as the web and is made thick enough to carry the shear. It acts also as a long slender column, so must be safe against crippling. When proportioned to carry the shear and the thickness is greater than 1/60 the depth between the rivets in the upper and lower flanges the plate is safe against crippling. When designed to carry the shear and a thickness less than 1/60 the depth is obtained, it is necessary to use stiffeners spaced regularly at intervals equal to the depth of the girder. Additional stiffeners are placed under concentrated loads and at the ends. Intermediate stiffeners are sometimes crimped over the flange angles, but it is as common to have fillers placed under them, the thickness of the fillers being equal to the thickness of the flange angle, so the stiffeners will be straight and have the ends resting on the outstanding leg of the flange angles. No scientific rules seem to be commonly accepted for designing intermediate stiffeners, the usual empirical method being to have the outstanding leg equal in width to 1/30 the depth plus 2 in.

End stiffeners act as columns to carry the end shear, which is delivered to them by the web plate and carried to the bearing plate. Stiffeners under concentrated loads are also designed as columns. The ends of all stiffeners designed as columns should be milled or ground to fit perfectly against the bottom flange angles. Divide the load by a fiber stress of 12,500 lb. per square inch for the area of the stiffeners and use fillers to keep the stiffeners straight.

(*To be continued.*)

Silver Rivet Instead of Cornerstone

One of the unique features in connection with recent building operations in New York City was the use of a silver rivet instead of the time-honored custom of laying the cornerstone of a new building. At the corner of Madison Avenue and Forty-Second Street, a twenty-six-story structure is being erected, and instead of the usual ceremonies incident to the laying of the cornerstone, the owner drove a silver rivet into the iron work of the building. When completed this rivet will be exposed in a silver-lined recess in the main entrance lobby of the building, which is expected to be ready by the first of May, 1916. This new structure, it may be interesting to state, is the first steel building designed in accordance with the recent building ordinance. The architects are Jardine, Hill & Murdock, and the contracting engineer Russell B. Smith.

White Cedar Shingle Makers Organize

The Northern White Cedar Shingle Manufacturers' Association is the title of an organization just effected with W. B. Thomas of Manistique, Mich., as president; W. H. Holt of Oconto, Wis., as first vice-president; M. D. Reeder of Boyne City, Mich., as second vice-president, and A. C. Wells of Menominee, Mich., as treasurer.

According to the Constitution and By-Laws the association purposes "to establish definite grades, a thorough inspection service, a trade mark, publicity campaign, the inauguration of favorable freight rates, supervise legislation—this to include tariff protection—and to effect more harmonious relationship between employers and employees."

Ventilation of Buildings in New York

Makers of the New Building Code Propose Some Radical Changes Regarding Light and Ventilation



IN the revision of the new Building Code for New York City a general plan has been laid out by Rudolph P. Miller, expert to the Building Committee of the Board of Aldermen, which will compel builders of commercial structures to follow the general regulations of the Tenement House law with regard to apartment and tenement buildings in the matter of light and ventilation.

The preliminary draft dealing with this subject provides that the rooms of business buildings hereafter erected must be so ventilated, in case a direct exterior ventilation is not secured, that the temperature therein, under ordinary conditions, is not excessive, and that a standard of purity of air is maintained. The object sought is to secure proper conditions for the rooms in buildings of different kinds to make them habitable.

Ventilation Provisions

In public buildings a more positive means of ventilation is required. The provision in this case is that there shall be such a system of ventilation that there is an actual change of air within any room used for public purposes, such as places of assembly, hospitals and asylums, schools, etc. The provisions, however, are not to apply when the rooms used for public purposes are so large that there is more than 1000 cu. ft. of air space to each occupant and there is some exterior ventilation by means of windows.

A minimum size of rooms in residence buildings is specified, and another section excludes storerooms from the application of the article. Bathrooms may be ventilated in several ways, and windows utilized for the purpose of ventilating rooms to the outer air are required to have an area of at least one-eighth of the floor area of the rooms. The minimum area of any window is to be 12 sq. ft. and the window is to be so arranged as to open for about one-half of its area. Provision, however, is made so as not to exclude mullioned windows in which the aggregate area of the separate parts equal the required area for any window.

The Size of Courts

No attempt is made to say what shall be provided in any building in the way of courts, but a minimum size of court, dependent on its height to the roof of the building, is specified when courts are to be used for purposes of ventilating rooms. No court under the proposed article shall be less than 4 ft. wide in any case, nor shall such minimum width be less than 1¼ in. for every foot of height to the roof of the building.

Yards are required at the rear of every residence building having a minimum width of 10 per cent of the depth of the lot, but in no case less than 6 ft. Such yards must extend across the entire width of the lot, and be unobstructed for their full height from the floor level of the lowest story used for residence purposes. When a building, however, faces on two or more streets these yards are not required.

Regulation for Old Buildings

Another section provides that all courts used for ventilation purposes as in the article prescribed shall be connected to the street or yard by means of an intake at the bottom of the court. The minimum size of such intake is 5 per cent of the area of the court, except that no intake shall be less than 4 sq. ft. When, however, a court exceeds 400 sq. ft., then the aggregate areas of intakes need not be more than is required for a court of 400 sq. ft.

These provisions are made to apply to buildings hereafter erected, but it is also provided that no existing building shall be enlarged, or its lot so diminished as to reduce the area of the yard or court below what is required for the proper ventilation of any room. It is also provided that no additional rooms shall be placed in any buildings that may hereafter be enlarged or altered unless such rooms comply with the requirements for rooms in new buildings.

Strength of Treated Timbers

A series of tests for the purpose of determining whether timber is weakened by preservative treatment have recently been made by the Forest Service and the result announced in Bulletin 286. The timbers used were Southern yellow pine and Douglas fir, and beams of large size were employed. Some of the deductions arrived at were as follows:

Timber may be very materially weakened by preservative processes.

Creosote in itself does not appear to weaken timber.

A preservative process which will seriously injure one timber may have little effect or no effect on the strength of another.

A comparison of the effect of a preservative process on the strength of different species should not be made, unless it is the common or best adapted process for all the species compared.

The same treatment given to a timber of a particular species may have a different effect upon different pieces of that species, depending upon the form of the timber used, its size, and its condition at the time of treatment.

New Publications

Safety Engineering Applied to Scaffolds. 350 pages. Size 6 by 9 in. Illustrated by 128 engravings most of which are from photographs. Bound in board covers. Published by the Travelers' Insurance Company. Price, $3.

The need of literature on the subject of scaffolds is readily demonstrated by the great number of accidents that occur, and the treatise under review has been brought out by the Engineering and Inspection Division of the Travelers' Insurance Company for the purpose of dealing with the safety problem in connection with scaffolds and scaffold-like structures. The first section of the book discusses the reality of the scaffold hazard while the second section treats of scaffolds in a general way, outlining the subject as a whole and reviewing the various forms that are most commonly used. There are thirteen sections in all, the third dealing with bricklayers' pole scaffold—American practice; the fourth, independent pole scaffold; the fifth, lashed scaffolds, and those which follow deal with special safety features; general features and operations of ladders, runways, stairways, etc.; building the horses; suspended scaffolds for construction work; platform and overhead types of scaffold machine; features common to both types of suspended scaffolds; carpenters' and outrigger scaffolds; painters' swinging scaffolds; needle-beam scaffolds; plasterers' and decorators' inside scaffolds; structures similar to scaffolds, and the final section is devoted to general counsel with regard to scaffold work.

Throughout the treatise special attention has been paid to American practice which differs in many respects from that which obtains in Europe.

Architects' and Builders' Pocket Book. By the late Frank E. Kidder. Compiled by a staff of specialists with Thomas Nolan, Editor-in-Chief. 1816 pages. 4¼ by 7 in. in size. 1000 illustrations. Bound in flexible morocco. Published by John Wiley & Sons. Price, $5.

This is the sixteenth edition of one of the best known works on building construction with which the trade is familiar. It has been revised and greatly enlarged, and Prof. Nolan with his corps of experts has rewritten the book from cover to cover. The authors have quoted from many authentic sources as well as presented the results obtained in their own daily practice. Every item has been carefully checked and the aim throughout has been to present clearly and concisely as well as in the least possible space all the information that is likely to be required by the architect, the building-contractor, the structural engineer and the draftsman, including data for estimating approximate costs.

This new edition of the work is divided into three sections, Part I explaining the practical application of arithmetic, geometry and trigonometry, while Part II treats of the materials, construction and strength and stability of structures. All the matter in the twenty-eight chapters of this section consists of special essays by experts. Reinforced concrete mill and factory construction is among the new subjects here treated. Part III is devoted to miscellaneous data and much new matter has been added, such as extended tables of specific gravities, weights of substances, architectural acoustics, waterproofing for foundations, the Quantity System of Estimating, etc.

Many of the tables have been re-arranged so as to read across the page instead of lengthwise as heretofore. One of the most important changes is the re-calculation of the tables and problems relating to unit stresses, especially those for the different woods. These have been changed to conform to the latest engineering practice. The derivation of many of the formulas used has been explained and numerous cross references enable the reader to use this new edition of Kidder's work as a text book for certain parts of the mechanics of materials as well as a handbook for office work. The tables of the properties of structural shapes, of safe loads for columns, beams and girders have been revised and many new tables added.

A large number of illustrations have been added, and the diagrams used from the latest edition have been redrawn and some have been printed with lines of different colors for the purpose of making clearer the demonstrations.

In its present shape the book is of such a nature as to make it a necessary volume in the library of every architect and builder in the country. It can be furnished through THE BUILDING AGE Technical Book Department, 239 West Thirty-ninth Street, New York City.

The Building Estimator's Reference Book. By Frank R. Walker. 612 pages. Size, 4½ x 7 in. Profusely illustrated. Bound in flexible covers. Published by the author. Price, $10.

This has been compiled as a reference book for those engaged in estimating the cost of constructing all classes of modern buildings, and gives the labor costs and methods employed in the erection of some of our present-day structures together with the prices of the necessary material and labor entering into the cost of all classes of buildings. The costs have been reduced to actual hours per unit of measure so that the figures may be applied to any rate of wage. The matter is comprised in 26 chapters and covers all phases of building construction ranging from the foundations to the finished structure. One of the features often overlooked by the estimator in preparing his bid is the overhead expense, and as the success or failure of a contractor depends upon the accuracy of the estimate this item is emphasized in the present work.

New Flat Buildings in Brooklyn

A notable feature of the building activity along the line of the recently opened Fourth Avenue subway in Brooklyn, N. Y., is the contemplated erection in the Bay Ridge section of twenty 6-family apartment houses estimated to cost $250,000. The buildings are to be erected on a plot 600 x 100, comprising the entire frontage on the south side of Sixtieth Street and Seventh Avenue.

Current News of Builders' Exchanges

"Organ" of the National Association of Builders' Exchanges—Important Meetings—Exchange at Sacramento

Minnesota State Association of Builders' Exchanges.

SUPPLEMENTING the brief announcement in our last issue of the annual meeting of the Minnesota State Association of Builders' Exchanges held at the headquarters of the Minneapolis Builders' Exchange, it is interesting to state that representatives of twenty-five cities were in attendance, completely filling the main assembly room of the Exchange. The morning session was devoted largely to a report of the president and other routine matters, and in the afternoon various trade topics were discussed in a way which showed a lively interest on the part of those in attendance. The "Uniform Contract Blank" adopted by the American Institute of Architects and the National Association of Builders' Exchanges was indorsed, and former president, F. J. Romer of the St. Paul Builders' Exchange, spoke in praise of this standard document, which is the result of so much thought and which represents the proper spirit of co-operation between architects, contractors, sub-contractors and owners.

The program included a luncheon at the Dyckman during which selections were rendered by a ladies' quartet. After the menu had been properly considered clever remarks were made by a number of those present. These included Emil Zauft, the retiring president of the State Association of Builders' Exchanges, and president of the Builders' Exchange at Duluth, A. P. Cameron, who had just been re-elected president of the St. Paul Exchange, Herbert M. Gardner, former president of the Minneapolis Exchange and of the State Association, F. D. Corning of St. Paul, and a Mr. Scott, a lumberman of Duluth, who gave a very interesting talk on the demand for better goods, finer workmanship and general improvement all along the line in the building field. The officers for 1916 were given in our last issue.

"The National Exchange Builder."

The National Association of Builders' Exchanges is about to issue an official organ to be called the *National Exchange Builder.* The magazine is to be devoted entirely to the interests of builders' associations as well as the building interest in general.

Sacramento Builders' Exchange.

Contractors, architects and material dealers of Sacramento have joined in the formation of a Builders' Exchange. Preliminary organization has been effected with a membership of about ninety, with William B. Rohl as chairman pro tem. A meeting will be held shortly to elect permanent officers and decide upon the definite lines to be followed, and several officers of the San Francisco Builders' Exchange will be present.

New Quarters for Detroit Exchange.

If present plans are carried to a successful conclusion, the Builders' and Traders' Exchange of Detroit, Mich., will, about March 1, take possession of the entire fourth floor of the Penobscot Building, and also the addition that is now being erected on Congress Street. We understand that over 15,000 sq. ft. of floor space will be devoted to provide offices and a permanent building exposition. The new addition will be devoted entirely to this building exposition, which is composed of exhibits of all kinds relating to the building industry. The architects of the city are co-operating to make the exposition successful, as it will prove advantageous to them, since they will be able to bring their clients to inspect materials, specialties, equipment, etc., located in a central place and at a great saving of time and effort.

Talk to Master Builders on India.

The members of the Master Builders' Association of Salem, Mass., were greatly interested in the talk given on Dec. 2 by Rev. O. W. Warmingham, who spoke on buildings and life in India. What made the event doubly interesting was the fact that Mr. Warmingham was born in India and possessed a fund of valuable information regarding the subjects upon which he spoke. A box lunch was served during the evening and a feeling of good fellowship prevailed.

Banquet of Pittsburgh Exchange.

The annual banquet of the Builders' Exchange of Pittsburgh, Pa., was held at the Fort Pitt Hotel on the evening of Thursday, Dec. 16, when a large representation of the membership was present to listen to the address of W. B. King, Washington, D. C., counsel for the National Association of Builders' Exchanges. The toastmaster of the evening was D. L. Gillespie, and in addition to a most excellent menu there was vaudeville entertainment and music.

Master Builders Hosts at a Coffee Party.

Bigelow & Harriman were the hosts at the recent coffee party of the Master Builders' Association at their rooms on Devonshire Street, Boston, Mass., over which Secretary William H. Sayward presided.

The speaker was William Stanley Parker, a Boston architect, who had for his subject "The New Standard Contracts."

After the address Mr. Parker answered questions from the floor pertaining to the "eternal triangle" that exists in the building business between the owner, architect and contractor.

Birmingham Builders' Exchange.

At the meeting of the Builders' Exchange of Birmingham, Ala., held Nov. 22, the president appointed W. A. Currie, P. E. Bostick, C. P. Lichty, a committee to consider the feasibility of adopting the new Standard Contract Documents approved by a joint committee from the American Institute of Architects and the National Association of Builders' Exchanges, and at the same time to devise ways and means for securing the co-operation of all contractors and sub-contractors interested.

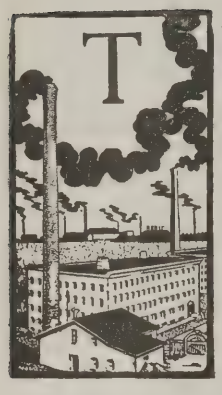
At the same meeting Frank Rushton gave a very interesting and instructive talk on "The Necessity of Business Organizations," and urged closer co-operation and more loyal support of such organizations.

New Secretary of Memphis Exchange.

Nearly a year ago the secretary of the Builders' Exchange at Memphis resigned, since which time the duties of the office have been in the hands of the assistant secretary, Miss Annie Laurie Berton. At a recent meeting of the board of directors A. L. Banning, Jr., was elected to fill the office of secretary, and early in December he entered upon his duties. Miss Berton will continue as assistant secretary.

Brief Review of the Building Situation

November Shows a Marked Increase in the Planning of New Work as Compared with November, 1914



THE encouraging reports which were noted in our last issue have continued in increasing volume and the building operations as reported for November show a very marked increase when compared with those for the corresponding month of 1914. The increased activity is confined to no particular locality as all four of the zones into which we have divided the country show very appreciable gains over the year before. Even in the extreme West, where heretofore the amount of new work planned has been less than during the corresponding period of 1914, the figures indicate a gain for November of 23¼ per cent. The gain for the country is 44.73 per cent.

In the cities of the Eastern States, of which thirty-seven have reported, there are thirty increases and only seven decreases, with a resultant gain as compared with November of the year before of 52.39 per cent. The more conspicuous gains are shown in Albany, Boston, Buffalo, Hartford, Newark, the five boroughs of Greater New York, Philadelphia, Rochester, Springfield, Syracuse, Trenton and Utica. The important decreases are confined to Allentown, Pittsburgh, Worcester, Wilkes-Barre, and Schenectady. The accompanying table gives the comparative figures.

CITIES OF THE EASTERN STATES

	Nov., 1915	Nov., 1914
Albany	$588,305	$301,578
Allentown	133,800	366,035
Binghamton	86,160	130,699
Boston	3,035,573	1,366,778
Bridgeport	490,973	368,859
Buffalo	788,000	498,000
East Orange	89,018	79,605
Easton	37,300	60,000
Harrisburg	84,375	34,000
Hartford	707,709	399,385
Lawrence	152,275	78,600
Manchester	111,898	87,665
Newark, N. J.	641,385	373,627
New Britain	199,585	60,263
New Haven	966,080	315,755
New York:		
Manhattan	4,601,215	2,058,244
Bronx	3,355,038	448,013
Brooklyn	4,282,576	1,617,445
Queens	1,760,389	1,148,586
Richmond	242,522	131,405
Paterson	149,585	46,961
Philadelphia	2,408,665	1,240,530
Pittsburgh	663,312	777,368
Portland	115,200	77,050
Reading	21,025	20,350
Rochester	817,254	397,830
Scranton	322,164	88,852
Schenectady	60,425	76,385
South Orange	100,220	41,550
Springfield	650,050	197,502
Syracuse	608,324	235,365
Trenton	157,595	79,239
Troy	70,735	37,450
Utica	151,035	96,300
Williamsport	17,500	1,500
Wilkes-Barre	48,535	76,493
Worcester	354,839	424,124

In the cities of what may be considered as the Middle States of the country thirty-three report an increase as compared with November, 1914, of 41.32 per cent. Of the cities reporting twenty-nine indicate increased activity while four show decreases. The conspicuous features are Chicago, Akron, Detroit, Milwaukee, Minneapolis, Omaha, Toledo and Youngstown.

CITIES OF THE MIDDLE STATES

	Nov., 1915	Nov., 1914
Akron	$525,105	$179,395
Cedar Rapids	119,000	250,000
Canton	135,050	43,675

CITIES OF THE MIDDLE STATES—*Continued*

	Nov., 1915	Nov., 1914
Chicago	10,861,600	6,513,150
Cincinnati	790,965	336,210
Cleveland	2,434,715	2,153,645
Columbus	347,350	377,385
Davenport	33,143	57,143
Dayton	131,075	53,625
Des Moines	125,070	93,302
Detroit	3,482,680	1,103,580
Duluth	204,371	189,510
East St. Louis	206,010	39,605
Evansville	277,383	57,086
Fort Wayne	160,525	100,975
Grand Rapids	335,325	171,425
Indianapolis	438,823	265,190
Kansas City, Mo.	724,115	341,220
Lincoln	186,705	39,475
Milwaukee	1,123,925	643,888
Minneapolis	1,539,225	703,615
Omaha	656,075	133,583
Peoria	197,575	605,200
Salina, Kan.	114,699	10,355
St. Joseph	64,819	36,410
St. Louis	782,943	650,029
St. Paul	619,701	710,697
Sioux City	194,297	84,477
South Bend	77,300	16,275
Springfield	147,145	55,100
Toledo	535,755	276,676
Topeka	69,650	35,105
Youngstown	203,790	38,405

Coming now to what may be designated as the southern zone, of the twenty-three cities reporting only two show decreases as compared with November of the year before. These two cities are San Antonio, Tex., and Shreveport, La.

CITIES OF THE SOUTHERN STATES

	Nov., 1915	Nov., 1914
Atlanta	$284,647	$232,104
Baltimore	690,478	274,980
Birmingham	121,904	79,710
Charleston	70,700	54,755
Chattanooga	53,532	28,258
Columbus, Ga.	17,200	6,600
Dallas, Tex.	269,498	133,850
El Paso	189,317	159,285
Fort Worth	124,243	104,840
Houston	204,255	100,076
Louisville	246,030	151,600
Memphis	191,485	133,275
Montgomery	16,541	15,790
Nashville	108,665	33,655
New Orleans	156,551	69,632
Norfolk, Va.	138,255	64,255
Oklahoma City	99,765	9,915
Richmond, Va.	275,251	130,638
Savannah	80,515	54,900
San Antonio	127,340	210,575
Shreveport	55,683	77,764
Washington	594,925	419,544
Wilmington	138,020	61,036

In the extreme Western section embracing the Pacific slope former decreases have been turned into increases with a result that the thirteen cities reporting show a gain of 23.25 per cent over the year before.

CITIES OF THE WESTERN STATES

	Nov., 1915	Nov., 1914
Berkeley, Cal.	$173,075	$162,200
Denver	312,085	134,410
Eugene, Ore.	14,493	8,325
Fresno	75,127	28,337
Los Angeles	1,000,239	785,310
Oakland	455,460	281,769
Portland	210,595	453,830
San Bernardino	16,650	11,552
Salt Lake City	156,705	171,800
San Francisco	1,332,053	988,587
Seattle	798,810	229,615
Spokane	46,475	55,700
Tacoma	75,465	270,655

The gains which have been made during the last few months of 1915 have been sufficient to offset the decreases in the earlier portion of the year so that there is an appreciable percentage of gain for the eleven months of which reports have been presented. All indications point to a veritable "boom" in the building industry with the opening of the spring season.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Berger's Puttyless Skylight

One of the prime requisites of a satisfactory skylight is that it shall not leak, and experience has shown that a great deal of the trouble encountered with leaky skylights is traceable to the inferiority of the putty that is used in connection with them. For the purpose of overcoming this difficulty and rendering skylights water tight there has just been placed upon the market by the Berger Mfg. Company, Canton, Ohio, a construction especially designed for the purpose and which entirely eliminates the use of putty. Through mechanical means the joints of glass and frames are made wind and water tight. An idea of the appearance of the skylight may be gathered from an inspection of Fig. 1. The point is made that these puttyless skylights are more easily and quickly erected, and in the case of a broken glass, replacement can be made without difficulty or loss of time.

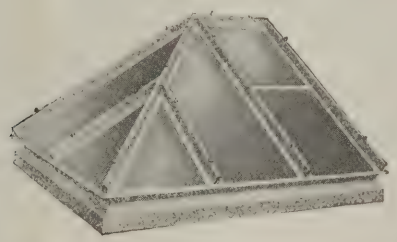


Fig. 1—General View of Berger's Puttyless Skylight

Upson's Processed Board

Samples of what is described as "the most dependable board made in America" are being distributed among the trade by the Upson Company, Lockport, N. Y. Each sample is inclosed in one of the pockets of a folded envelope while the other contains an illustrated circular giving the facts in regard to the wall board in question. The sample measures about 3 in. in width by 4¾ in. in length, one side being finished to show the actual appearance of the material. Emphasis is laid upon the fact that the board in addition to being sized through and through is also kiln cured and waterproofed "by the original Upson method." It is claimed that walls and ceilings lined with this "processed" board will not chip, crack or fall. Panels of Upson board can be nailed directly over old plaster or on to new framework by any man who is handy with a hammer and saw.

Whalebone Wall Ties

One of the leading products of the Allegheny Steel Band Company, Pittsburgh, Pa., is the whalebone wall tie which can be used for any style of construction whether solid or veneer, and is claimed to be a permanent fixture when once placed. The company lays special emphasis upon the quality of these ties, and states that they are made from the best grade of galvanized sheets. It is not the scrap from several other articles running in gages as light as tin and weighing as low as 30 lb. to the thousand, "but is the best grade, never lighter than 22 gage or 1/20 to 1/32 in thickness and weighing 50 lb. to the thousand." Every tie is said to be guaranteed as represented. The ties are made ⅞ in. wide and 7 in. in length and are not only "high in quality but low in price."

Catalog of Carpenters' Tools

A handsome sixty-four-page catalog covering a wide variety of hollow mortising chisels and wood-boring tools is being sent to carpenters and builders by the Forest City Bit & Tool Co., 1206A Kishwaukee Street, Rockford, Ill. The index at the back of the book contains reference to more than sixty commodities. In the introductory it is stated that all tools are manufactured from selected grades of steel, and high grade products are turned out from a factory equipped with modern machinery, operated by skilled machinists. A copy of this catalog may be had by any reader of the paper if he will write to the company at the given address.

Sheet Metal for Interior Decoration

We have before us a copy of a very attractive catalog of metal ceilngs and side walls which is being sent out by W. C. Hopson Company, Grand Rapids, Mich. It consists of sixty pages measuring 12¼ x 9 in. in size and carrying a large number of well executed halftone engravings of original and exclusive patterns in French, Gothic, Colonial and miscellaneous designs. Attention is called to the fact that the new lines of steel ceilings illustrated embody the best thought and skill of the most experienced designers and artisans in ornamental metal. The requirements of the architect, the owner and the builder have been met by designers having a full appreciation of the possibilities of sheet metal as a decorative material as well as of its restrictions. The engravings have been executed with a fidelity to detail which cannot fail to impress the architect and the builder, and as showing one of the multitude of designs contained within the covers of the catalog, we present in Fig. 2 a picture of a field plate 24 x 24 in. in size. Among the early pages of the catalog are rules for measuring ceilings and side walls which cannot fail to be appreciated by the sheet-metal contractor, and there are also general instructions for installing the work. In many instances an entire

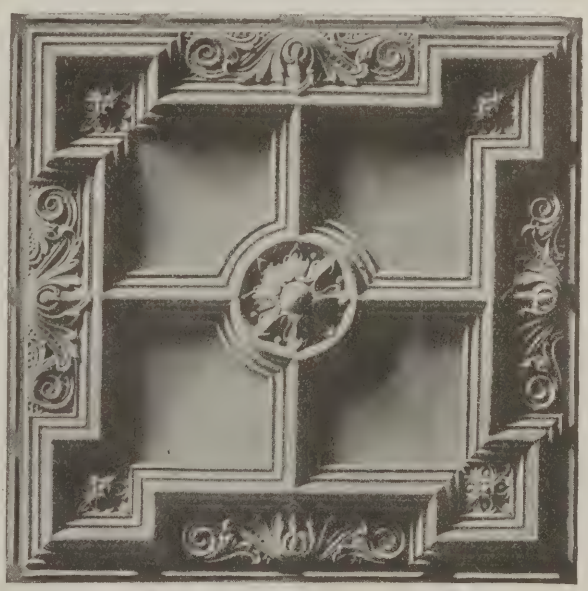


Fig. 2—Sheet Metal for Interior Decoration

page is devoted to a composition design so that the reader may obtain a much better idea of the effect produced than would be the case from a small field plate. In other instances a number of illustrations are found on a single page, more particularly in connection with moldings, cornices, cornice miters, etc. We learn from the company that it has recently installed a new and modern stamping room for the purpose of turning out the new line of steel ceilings and side walls above referred to.

The Fiberlic "White House"

There has recently been completed on the Jersey coast a most attractive cottage of the bungalow type which is known as the Fiberlic "White House." It was built by A. N. Hanson, Atlantic Highlands, N. J., and embodies many interesting features from the standpoint of the architect and builder. The living room is a

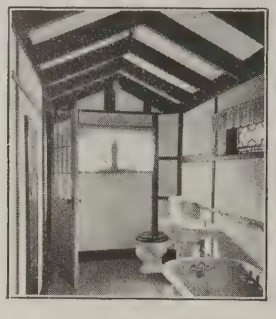
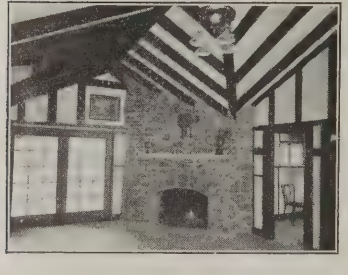


Fig. 4



The Fiberlic "White House"—Figs. 3 and 4, Showing Interior Views of a Bath Room and a Living Room Finished with Fiberlic Board

striking feature of the planning, and is reached through a hall communicating with the porch by means of a Craftsman front door. At the northern end of the living room is a veranda, from which can be seen New York, Sandy Hook, Coney Island and Far Rockaway. An attractive feature of the interior is the material used in the walls and ceilings, this being Fiberlic wall board. Fig. 3 of the illustrations is a view of the living room showing the fireplace end and the effect produced by the use of the wall board in question. Fig. 4 is a view in the bathroom, which is surfaced with white enameled Fiberlic. It may be interesting to state in this connection that the wall board as made by The Fiberlic Company, Camden, N. J., possesses great strength and durability, and is claimed to be not only odorless and sanitary but also a good non-conductor of sound as well as a fire-retardant. This combination makes Fiberlic especially attractive to the home builder.

Arkansas Soft Pine for Enamel Finishes

The Arkansas Soft Pine Bureau, Little Rock, Ark., has recently issued an attractive eight-page booklet entitled "Do You Prefer White Enamel?" The cover is printed on blue stock and the title is reproduced to resemble white enamel. The first four pages give many interesting facts about the use of white enameled woodwork for interior decoration, and the remaining data present some conclusive arguments for Arkansas soft pine as the best wood on which to apply white enamel. It is said that it will not overabsorb or stain white enamel. The specific tically free from pitch, rosin, rosinous oils, or "sugar"; that it has a fine grain and tough fiber, which create a physical condition favorable to well-balanced absorption, and that while the wood, being free from rosin, is soft, it is not of the cork-like softness of certain woods which, for their part, actually drink up the applied enamel. It is, in fact, a tough, resilient wood which takes the filler and flat white coats to a nice degree of penetration. The pigment and oil are tenaciously embraced by the fiber of the wood in such a way that the application becomes actually inlaid with its "roots" in the core of the wood and its outer surface coinciding with the surface of the woodwork itself. A fixed surface is thus established on which the final enamel coats are applied. As the wood ages, this surface becomes harder, so that a durable woodwork on which the enamel retains its luster is the ultimate result. With this character of surface and because of the absence of pitch, rosin, and sugar elements, which are the primary causes for discoloration, it is said to be physically impossible for Arkansas soft pine to stain the enamel from underneath. In the light of these advantages this wood offers a very durable and economical medium for white enamel finishes. It has the additional advantage of being readily obtainable, due to an unlimited supply. For good results the following formula is presented: Sand perfectly smooth and apply one coat of white lead; sand smooth again, then apply two coats of enamel undercoating; sand smooth and apply two coats of finish enamel. This will produce a gloss finish. If an egg-shell or dull effect is desired, the last coat should be rubbed, when hard, with pulverized pumice stone and water.

New Double Crank Ratchet Bit Brace

A new whimble or double crank ratchet bit brace, known as No. 124 W, has been placed upon the market by the John S. Fray Company, Bridgeport, Conn. This brace is designed for heavy work, having the advantage of the double sweep, with ratchet action, and it is fitted with the company's "Dreadnaught" ball bearing chuck. The chuck, which is made of wrought and bar steel throughout, with all the wearing parts hardened, has a capacity for holding and driving from the smallest sized twist drill up to the 1½-in. round, straight or taper shank drills and bits, also any square taper shank bit up to and including No. 2 Clark expansive bits. The head and handle are made of cocobolo. All metal parts are full polished and nickel-plated, except the jaws and pawls, which are straw color.

Ball Bearing Floor Surfacing Machine

A floor surfacing machine operated by electricity, and embodying as one of its most important features heavy steel ball bearings on both the roller and the shaft is illustrated in Fig. 5. The machine is one which has been added to the assortment turned out by Wayvell Chappell & Co., Department E, 4845 East Ravenswood Avenue, Chicago, Ill., and is constructed of ample weight for both rapid and high-grade work. It is provided with a readily exchangeable motor, mounted above the roller, and with a large and powerful dust-collector fan set close behind the roller, thus making a very compact and strong machine. In order to secure a smooth-running yet flexible roller, free from vibration and chain jumping, the company has provided an exclusive feature in the shape of its countershaft chain drive. The roller is supported on arms, which are pivotally mounted to move about this shaft as a center, and in this way is allowed a yielding movement so that the chain pull is at an even tension. The arrangement of parts is such as to allow the roller to adjust itself to any unevenness of the surface as it advances over the



Fig. 5—General View of Floor Surfacing Machine

(Continued on page 72)





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I WANT to show you how you can increase **your profits.** All I want you to do, Mr. Contractor, Mr. Carpenter, Mr. Builder, is to send me the coupon—or a post card—for our Catalog. I will send it to you—anywhere—and write you at the same time. The fact that

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No matter where you live, we guarantee safe and prompt delivery. We have customers everywhere. Our plant is the largest in the world. We sell everywhere on earth. Our own architectural staff will work up your plans from your own rough sketches. The cost is but a fraction of what you would have to pay locally. For every nickle in freight, we will save you dollars on the bill. I want to tell you more about this when I write you.

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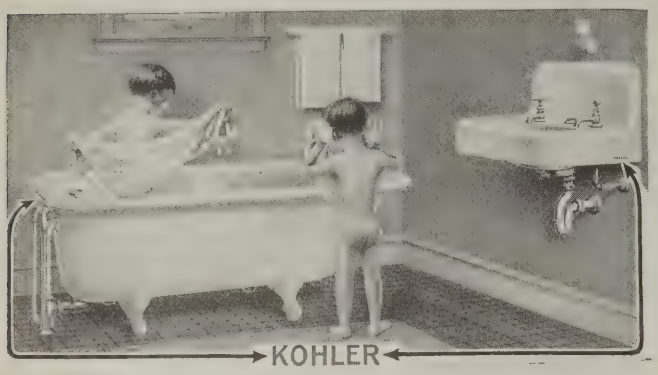
WM. RIORDON,
Mgr. Contractors' Dept.

Gordon-Van Tine Company
798 FEDERAL STREET, DAVENPORT, IOWA

GORDON-VAN TINE CO, 798 Federal St., Davenport, Iowa.
Gentlemen—Please send **free** the books checked below:

- ☐ Building Material Catalog [Lumber, Millwork Hardware, Paints, etc.]
- ☐ Standard Home Plan Book
- ☐ Ready-cut Plan Book
- ☐ Barn & Outbuilding Plan Book
- ☐ Garage Catalog
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- ☐ Roofing Samples

Name .....
Address .....
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"Colonna" Bath, Plate No. K-64 *"Emmett" Lavatory, Plate No. K-332*

The KOHLER trade-mark appears on every piece of KOHLER enameled plumbing ware. It is incorporated in faint blue in the enamel, at the points indicated by the arrows.

Builders avoid risks by selecting KOHLER plumbing fixtures

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The pure whiteness of the enamel is a distinguishing feature of every KOHLER plumbing fixture.

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We manufacture fixtures suitable for houses and apartments of all classes.

If your plans call for a built-in bath, be sure to select the "Viceroy." It has won favor everywhere.

Your dealer will furnish full information concerning KOHLER production and prices.

Write for our "Viceroy" catalog.

MAKERS OF Enameled Bathtubs, Lavatories, Sinks, Etc.

"It's in the Kohler Enamel"

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Founded 1873
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floor as well as to take up any sudden jar on the machine. The brake-gage, which is instantly locked in position by the finger lever on the handle, holds the roller in a tilted position against the floor, gages the depth of cut for steady and uniform work, and brakes the forward progress of the machine, which is self-propelling when in operation, thus making continuous work easy. The moment the brake-gage is unlocked the weight of the motor raises the roller from the floor, stopping the work without the operator being obliged to shut off the power. The claim is made the machine surfaces to within 3 in. of the wall without the edge roller and with it, close up to the baseboard. The machine is made in five sizes, thus meeting many requirements.

Bigger Profits in Asphalt Shingles

An aggressive campaign for better roofs is being successfully carried on by the Asphalt Shingle Publicity Bureau, 854 Marquette Building, Chicago, Ill. A book of suggestions, entitled "The Roof Distinctive," has been issued for distribution among carpenters and builders to substantiate the Bureau's claim that the asphalt shingle is "destined to roof the nation's homes." This book not only tells about the beauty and long life of this class of roofing, but also gives many valuable pointers for making larger profits and some concrete examples illustrating why the house owner will be better pleased with asphalt shingles. Many convincing arguments are advanced to demonstrate the superiority of these products. It is pointed out that too often home



Fig. 6—Cement Coated House Roofed with Asphalt Shingles

builders neglect the roof, largely because they do not wish to incur the expense of the more costly and more decorative roofing materials. Asphalt shingles are fire resisting, easily laid and of moderate cost. The shingle is composed of a flexible body of felt, made of long fibers through which hot asphalt is forced and into every pore of the felt, so it is completely coated and surrounded with asphalt. On the upper surface a layer of crushed stone or rock is applied. The shingles are uniform in size, measuring about 8 in. wide by 12½ to 12¾ in. long. A house roofed with these shingles is shown in Fig. 6 of this illustration.

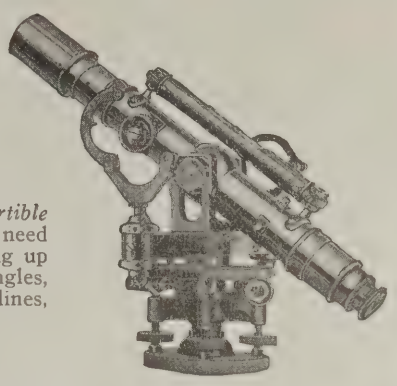
When the year's business is analyzed by the building contractor and he discovers that profits are not up to expectations, he naturally seeks broader fields offering opportunities for increased business. The sale of asphalt shingles, if intelligently handled, will not only decrease overhead expenses and increase profits, but will insure the continual employment of workmen who will soon become skilled artisans, or specialists, in one particular branch of the building industry.

Now that the winter has set in roofs will be forced to stand the test of climatic extremes, and the coming of spring will find many roofs fallen by the wayside. This is an opportunity for the enterprising carpenter and builder to solicit desirable business by selling a roof which is impervious to decay. The progressive builder will find it profitable to divide his town into a number

(*Continued on page 74*)

Rent this Level 10 Months Then It's Yours

Builders and Contractors



This is not the old style Architect's Level. It is the newest 1915 model *convertible* level. There is not a single Builder or Contractor who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder or contractor can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level, 1915 model. Don't confuse the Convertible Level with the ordinary old style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

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Please send free instruction book on the use of the Convertible Level, 1915 Model, and complete details of your rental plan. This request in no way obligates me.

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City..... State.....

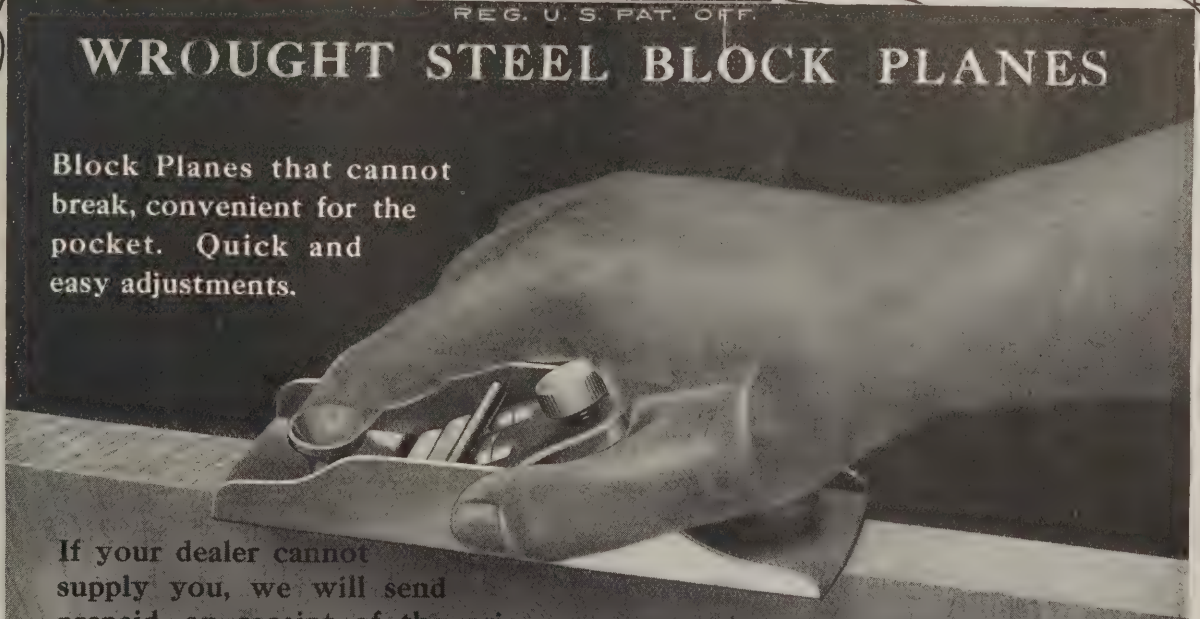
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WROUGHT STEEL BLOCK PLANES

Block Planes that cannot break, convenient for the pocket. Quick and easy adjustments.



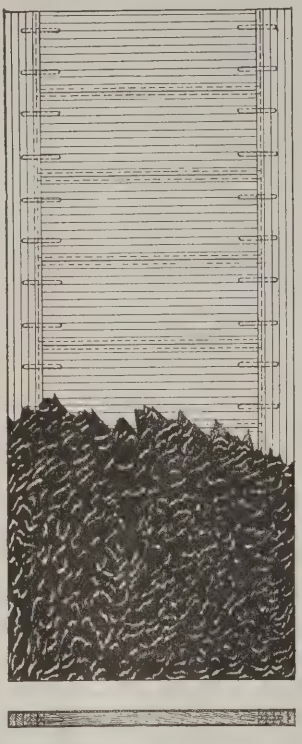
If your dealer cannot supply you, we will send prepaid, on receipt of the price,

No. 5206—6-inch Nickel Plated Plane, $1.00
No. 4206—6-inch Polished Plane, - 90 cents

For full description of Sargent Warranted Planes, send for the Sargent Plane Booklet.

SARGENT & COMPANY, Makers of Planes squares and Mechanics' Tools
53 Water Street, New Haven, Conn.

"Sanitary Flush No Warp Doors"



Unequalled for entrances to bungalows, hospitals, schools, hotels, offices, etc. They are very attractive, never warp and are fire and sound retarding.

Furnished in many designs in any veneer and glazed with any design or kind of glass.

Read specifications and send for Catalogue.

SPECIFICATIONS:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated. Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

Hyde-Murphy Co., Ridgway, Pa.

New York Office: 507 5th Ave.

Pittsburgh Office: 6101 Penn Ave.

Keep Your Men Busy This Winter at a Big Profit to You



THERE IS A BIG PROFIT TO YOU IN SELLING AND LAYING "SANTILITE COMPOSITION FLOORING" IN THE DULL WINTER MONTHS.

As you know, "SANTILITE COMPOSITION FLOORING" is laid just like plaster ⅝ of an inch thick on any sub-floor of wood or cement—sets in 6 to 8 hours into a smooth, jointless, absolutely sanitary surface without cracks to collect dirt, germs and filth—absolutely no trouble to keep clean—never grows dusty regardless of wear—extremely easy to stand and walk upon—fire will not burn it—water will not soak it—of permanent pleasing appearance—never requires painting and will last the life of the building.

"SANTILITE" is the ideal floor in the home for the kitchen, pantry, bath or any room where a sanitary, dustless floor is wanted. It is extensively used in the factory for offices, halls, lockers, toilets in the store, restaurant, cafe, public or semi-public building in areas subjected to heavy wear where a pleasing appearance, durability and absolute sanitation are required.

There are many masons, building and cement contractors who are making big profits in selling and laying "SANTILITE." It enlarges that branch of your business where there is an ever-increasing demand—every home with a wooden bathroom or kitchen floor needs it—every public place that has lots of wear must have it. You will find that there is little competition in your own locality and it is especially attractive, for it keeps your men profitably busy during the closed or Winter Season.

Write for samples, illustrated instructions for laying "SANTILITE" and our proposition to make your winter's work profitable.

SANITARY COMPOSITION FLOOR CO.

134 Plum Street, Syracuse, N. Y.

of districts. When the snow melts, sections should be visited periodically, and for the man owning an automobile the matter is really a sinecure. When a roof gets so old that leaks are constantly developing the cheapest repair work is to tear the roof off and replace it with a new one. It will be money saved in the end.

Attractive literature will be furnished by the individual asphalt shingle manufacturers for the purpose of assisting the contractor to circularize his customers and prospective clients. This missionary work may be profitably augmented by personal calls. In other words, instead of waiting for work to come to the shop the progressive contractor elevates himself from the class of an order taker to that of a business builder. It will mean the inauguration of a selling scheme that will unquestionably produce satisfying results at a very low cost for overhead expense.

A close study of this field will fortify the contractor with a line of logical arguments against which there can be little comeback. Houseowners who contemplate selling their homes will find a re-roofing job a profitable investment, and a great many houses are in such a poor condition from a roofing standpoint simply because the local contractor is not alive to the opportunities in his town. Real estate operators and contractors who make it a practice to build rows of houses, either for direct sale or on the installment plan, are becoming large buyers of asphalt shingles. Many years' experience has proven that this type of shingle almost invariably adds to the price that can be secured for the homes, or, at least, makes them far easier to sell.

The Asphalt Shingle Publicity Bureau is ready to cooperate with readers of THE BUILDING AGE in the distribution of literature. Lists of names sent to 854 Marquette Building, Chicago, Ill., will be kept on file and helpful descriptive matter on asphalt shingles will be mailed.

A New Diamond Slab Asphalt Shingle

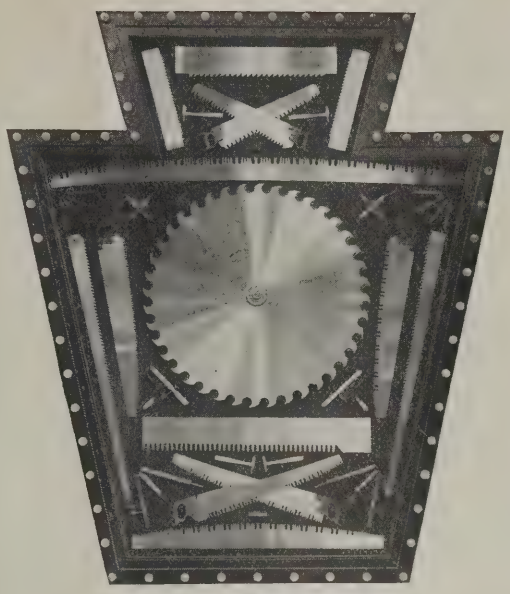
An asphalt shingle which is the result of years of painstaking effort and experiment, and which is claimed to be actually cheaper than wood, is the Diamond slab Flex-A-Tile which has been placed upon the market by the Heppes Company, 1011 South Kilbourne Avenue,



Fig. 7—New Diamond Slab Asphalt Shingle

Chicago, Ill., and illustrated in Fig. 7. The first noticeable difference in the appearance of the shingle as contrasted with the ordinary product is its shape, the new shingle being built in the form of a diamond. The reason for this shape is said to be that it permits of a more economical arrangement of the shingles on the roof, and the company points out that in this respect the economy is such as to effect an annual saving of 23 per cent in material without changing protection qualities of the shingle. This diamond shape is the patented feature which differentiates the Diamond slab shingle from other asphalt shingles. There is also a very perceptible saving in labor, for instead of laying the shingles one at a time as in the old way, they can be laid four at a time, and are self-spacing. Other features of economy are the saving in nails and in the cost of transportation. The latter is said to be due not to any reduction in the essential ingredients, for in fact the Diamond slab shingles are actually heavier than many standard weight asphalt shingles, but the method of cutting them permits of economy of material weight amounting to at least one-third. The Diamond shape permits of unusual color combinations and decorative schemes unobtainable with old-style shingles. Attention is called to the improved appearance of the new

(*Continued on page 76*)



Keystone No. 4 Disston Exhibit

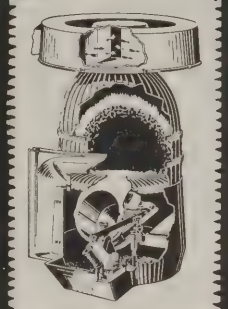
Panama-Pacific International Exposition

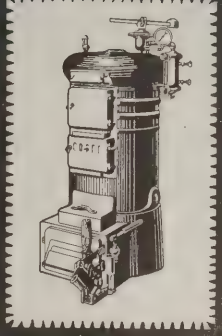
12 Highest Awards
including
4 Grand Prizes

Saws
Tools
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Henry Disston & Sons, Inc.
Philadelphia, U. S. A.

They Save ½ to ⅔ Coal Cost -GUARANTEED





If you are a builder, or are having a house built for you, it will pay you to investigate the wonderful money-saving advantages of the Williamson New-Feed UNDERFEED Furnace or Boiler.

As an example of UNDERFEED efficiency and economy, just read this letter—one of thousands like it telling of advantages of the Williamson New-Feed UNDERFEED way:

"Upon your request as to how I liked the UNDERFEED that was installed in my house about two years ago, will say that I am perfectly satisfied, as I have eight rooms and bath in my house—and not small rooms at that. The house is 30′ x 34′; first story, 9′ 4″; second story, 8′ 6″ high.

"The first year I used about $37 worth of coal and this last year $35 worth. The entire house was kept warm and no other stove in the house except a gas stove for cooking.

"In the last two years I saved not less than 45 per cent on my fuel bill with every room warm."

(Signed) SAMUEL ISELY, Monroe, Wis.

WILLIAMSON NEW-FEED UNDERFEED Furnaces and Boilers CUT COAL BILLS ½ to ⅔

The "Candle" Principle

The New-Feed UNDERFEED effects this great economy and comfort because it burns coal on the "candle" principle. All fuel is fed from below. Thus the fire is always on top—it doesn't have to fight its way against new coal—fire is never chilled because there are no top feed doors to open. And, what is very important, all smoke, dirt and gas are burned and transformed into valuable heat because they must pass up, *through* the fire.

Burns Cheaper Coal

And the UNDERFEED burns the cheaper grades of coal as effectively as other heaters burn the more expensive grades. That's a first great saving that the owner can be absolutely sure of. Operation is simplicity itself—a boy of 12 can do it all with "expert" results.

½ to ⅔ Saving GUARANTEED

Yes, this saving is actually guaranteed where the New-Feed UNDERFEED is properly installed and operated. A Million Dollar concern stands back of that guarantee. Thirty-five thousand UNDERFEEDS are in use. Adapted for use with warm air, steam, hot water, vacuum vapor and combination systems.

Ask for Free Book

Send the attached coupon to-day for interesting book, "From Overfed to UNDERFEED." It solves many a heating problem for you. Send it NOW.

THE WILLIAMSON HEATER CO.
(Formerly the Peck-Williamson Co.)
432 West Fifth Avenue, Cincinnati, Ohio

The Williams Heater Co., 432 West Fifth Avenue, Cincinnati, O.
Tell me how to cut coal bills from ½ to ⅔ with a Williamson New-Feed. Warm Air..... Steam or Hot Water.....
(Mark X after System interested in.)
Name .....
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DEALERS: Let us tell you about the *New-Feed* UNDERFEED and our new proposition. Both are winners.

You Build Reputation With Asphalt Shingle Roofs

Asphalt Shingles — Destined to Roof the Nation's Homes

EVERY Asphalt Shingle roof you lay adds to your reputation in the minds of your customers. And it makes *you more profit.* This roofing looks better, lasts longer, needs fewer repairs and pleases the owner in a way that makes him thank you for suggesting their use.

Asphalt Shingles

"Destined to Roof the Nation's Homes"

Do not forget that they *save labor*—fewer to lay, large and uniform size—which means a larger profit per job. Yet with all this they cost the house owner about the same as a commonplace roof.

This Free Book Will Help You

Send for booklet *"The Roof Distinctive."* Tells about them and suggests beautiful roofing effects.

Asphalt Shingle Publicity Bureau

854 Marquette Bldg., Chicago

Carpenters——

Here's a Chance to Make Money This Winter



An indoor closet that is cheaper than an outdoor privy and makes you more money. Easy to install—sells on sight—a sure sale in almost every home that has no bath room. Absolutely sanitary and odorless. No disease breeding outdoor vault. Germs destroyed chemically. As easily emptied as the ash pan of a stove.

Ro-San Indoor Closet

Guaranteed To Be Satisfactory

Don't these letters from carpenters sound like business?

"I haven't been able to put in much time on your proposition, but I enclose seven orders. These will help sell others who are waiting to see how the closets work."
Ed. Lamen, Flora, N. Dak.

"I set my closet up in my office and sold it the next day. Enclosed find six more orders."
S. W. Cassidy, Herkimer, N. Y.

"Enclosed find five orders. One is for a sample for myself. The other four I sold right from your catalog."
C. F. Berthelsen, Clear Lake, Ia.

"Please hurry shipment of closets. I sold two today without doing any talking at all. They sell themselves."
C. B. La Huis, Grand Rapids, Mich.

Representatives wanted in each town. Carpenters—contractors, here is your chance. Good profit for little work. Write today for complete details.

Rowe Sanitary Mfg. Co.

185 Sixth Street Detroit, Mich.

Ask about the Ro-San Wash Stand. Running water (hot or cold) without plumbing.

shingle, which means a more attractive roof, and at the same time the new product retains all the advantages of the regular Flex-A-Tile.

Concrete Mixers for Mortars and Plasters

The advantages of having a machine that can be used for mixing concrete and cement mortar, as well as lime mortars and plasters are especially important to the building contractor, as he is enabled thereby to keep the machine in use most of the time during building operations. Many contractors using in connection with their concrete work the "Standard" low-charging mixer,



Concrete Mixers for Mortars and Plasters—Fig. 8—The Machine in Use

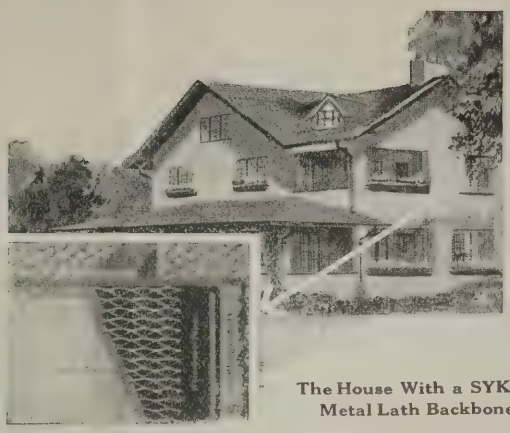
made by the Standard Scale & Supply Company, 1345-47 Wabash Avenue, Chicago, Ill., have found that they could utilize the cement machine for mixing mortars and plasters and obtain even better results than with special mortar mixers. The reason for this is said to be due to the fact that the "Standard" machine is easy to operate and does not provoke the troubles so frequently experienced with the revolving blade type. The discharge does not clog or prevent the free mixing of the materials. The company states that one of the first big jobs with which the machine was used was the towering Woolworth Building in New York City, all the plaster for this gigantic structure having been mixed in the "Standard." In Figs. 8 and 9 we show the machine in use for mixing mortar for a building 75 x 100 ft. in plan. The same mixer was also used for the concrete foundation work and also for lime and cement. All the mortar for the work was mixed by the one machine. The contractors for the building were J. C. Nel-



Fig. 9—Another View of the Building Operation Showing the Mixer

son & Son, Minneapolis, Minn., and Mr. Nelson states that in the future he will use the machine for mixing brick mortar at all times as it is the cheapest and best method. In the picture the mortar boxes are shown in front of the machines where the lime is slacked and the preliminary mix with the cement is given. By the discharge side of the machine can be seen the mixed mortar.

(*Continued on page* 78)



The House With a SYKES Metal Lath Backbone

Metal Lath—surely! That's the true backbone of strength. But what kind of metal lath? It is well to remember that **weight** adds rigidity and durability; and that Sykes Expanded Cup Metal Lath, having **wider strands**, is much **heavier** than others cut from the same gauge. Judge metal lath by weight and gauge—not by gauge alone. Also remember that

SYKES Expanded Cup Lath
Self Furring

being fastened direct to sheathing boards or studding, requires no furring strips, and so saves you 5 to 10 cts. a square yard.

Best for Interior Work as well as for Stucco Work.

A perfect key is assured by the expanded cup style. Sykes Metal Lath can't be applied wrong.

Approved by U. S. Government for Post Office work; indorsed by architects.

The Sykes Booklet—Complete Specifications for Stucco on Metal Lath—sent free on request—will show you how to save money. Let us send you this booklet and a Free Sample of Sykes Expanded Cup Metal Lath. Write us today—

Sykes Metal Lath and Roofing Co.
494 Walnut Street, Warren, Ohio

Try This On Cement Stuccos



You can turn a forceful stream of water on Kellastone Stucco and it cannot permeate the rock-like Kellastone mass because its firm, compact, texture renders it non-porous. It defies the attack of the elements. There's a vast difference in stuccos—just as there is in lumber, brick, paint, etc. Kellastone is **pre-eminently a stucco.** It is prepared to withstand the ravages of time, fire and water.

You Can Apply

KELLASTONE
IMPERISHABLE STUCCO

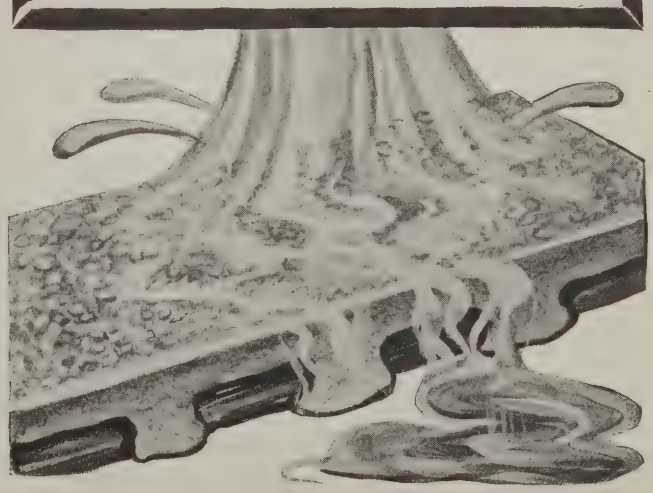
In Zero Weather

because, not being mixed with water, it will not freeze. Cement stucco is mixed with water. Turn a hose on it and note the rapid absorption of the water. Rain acts exactly the same. Cement stuccos are cheaper in first cost and may look nice for a time, but a Portland cement stucco is certain to absorb water, expand and contract, which will ruin it. Cheap stuccos are poor economy. Our free literature gives you the reasons. Send for it. It also describes

Kellastone Composition Flooring

for private homes, apartments, public buildings and industrial plants and Kellastone plasters for interior finish. A postal brings complete details.

The National Kellastone Co.
506 Association Building **Chicago, Ill.**



Handles Easily

—saws clean and smooth, no shrinking or warping to allow for when you are nailing it on, does not crack or break like wood paneling, always lies flat and straight,—these are some of the many strong features that our patented construction gives to

Compo-Board

Trade Mark Reg. No. 94745

It's a "right hand" material for any carpenter.

There are 1001 jobs that can be done with Compo-Board more satisfactorily, quicker, and with less muss, fuss and worry.

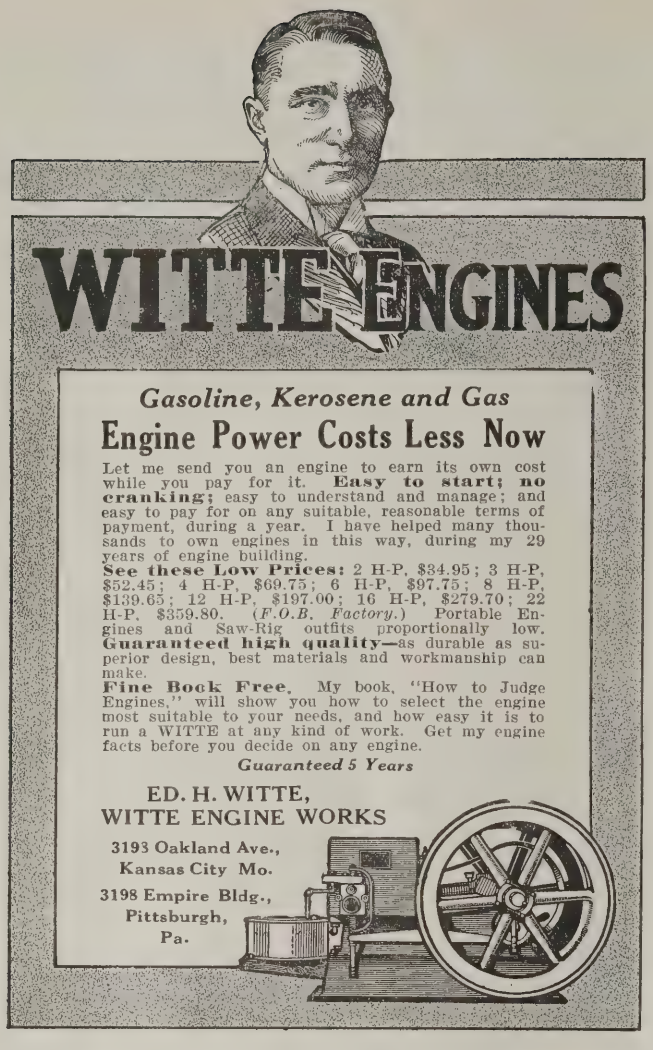
But do not get the impression, as many folks have, that "Compo-Board" is a popular name for "wall board." Compo-Board is our trade mark name for our distinctive kind of a wall board,—the kind with our patented centre core of wood slats, as illustrated in the border of this ad.

The wood core is the feature that gives Compo-Board so many strong advantages over other kinds of wall boards, and also the feature that makes "Compo-Board" so easily identified.

Sold by dealers everywhere in strips four feet wide and in lengths of one to eighteen feet, as desired.

Write for interesting book and sample.

The Compo-Board Co.
5778 Lyndale Ave. No.
Minneapolis, Minnesota



Waterproofing Concrete with Hydrated Lime

Some very interesting information on the subject indicated by the above title is contained in a 16-page pamphlet just sent out by the Hydrated Lime Bureau of the National Lime Manufacturers' Association, with offices in the Oliver Building, Pittsburgh, Pa. Emphasis is laid upon the fact that the use of hydrated lime in cement mortars and concretes, "increases the plasticity and lubricates the mass; reduces to a minimum the tendency toward segregation and increases the density and uniformity." The Bureau of Standards at Washington made elaborate tests covering practically all compounds which have been recommended for waterproofing cement mortars and concretes, and very complimentary reference is made to the merits of hydrated lime for the purpose named. In the pamphlet in question attention is called to the fact that the amount of hydrated lime to use for each specific job is dependent upon the proportions and grading of the aggregates. One point should therefore be borne in mind by the building-contractor, and that is, "no waterproofing material will compensate for improperly proportioned aggregate and poor workmanship in the laying of concrete and that the aggregate should be as carefully selected as the cement and waterproofing material." We understand that the bureau will send a copy of this little work designated as "Pamphlet F" to any architect, builder or contractor who may make application for it.

New Russell Jennings Screwdrivers

A full line of fiber-handled screwdrivers embodying interesting features from the standpoint of the practical mechanic has been recently placed on the market by the Russell Jennings Mfg. Company, Chester, Conn. The handles are made from vulcanized fiber which is practically indestructible, and the blade, forged from tool steel, extends through the handle.

The company's method of manufacture permits the use of a high-grade crucible tool steel high in carbon. These screwdrivers are made in standard dimensions and are also made with straight blade for cabinet-makers' use. For electricians' work a fiber cap is used on the end of the handle in place of the metal cap. The company is also putting out a special machinists' screwdriver made from square stock so that a wrench can be used on the blade when necessary.

This firm is also furnishing a special screwdriver kit which comprises one interchangeable blade handle and several screwdriver bits for use in the handle. Some of the kits are also put up with other tools. These same screwdriver bits can be used in the Russell Jennings precision bit braces. One advantage of this set is the fact that the blades themselves are comparatively inexpensive and the handle practically indestructible, so that after once purchasing a kit of these tools the cost for renewals is light.

Shingles That Last

"Make a Thatch for Thy Roof," is the opening phrase in the new catalog devoted to "Shingles That Last," issued by the National Sheet Metal Roofing Company, 339-345 Grand Street, Jersey City, N. J. At the top and bottom of every page in the book in a conspicuous color the words "Shingles That Last" are presented. It describes in detail how the metal shingle came to be devised by Charles D. Cooper in 1882 and calls attention to roofs which were covered with metal shingles in that period which are still in service. To answer the question as to their appearance pictures are given of a number of fine residences, churches and public buildings. Views are also shown in the manufacturing plant where the metal shingles, after being stamped to various ornamental designs, are coated with zinc on the tin coating of the material used for the purpose, giving a heavy weather-proof coating. Other pictures show the metal shingles laid on sheathing boards over shingles, and tables show the relative weights of a roof covered with different materials. The shingles are made 7 x 10, 10 x 14 and 14 x 20 in. in size with a special lock. The company also makes a Spanish tile either in galvanized tin plate or in copper of different weights. It also makes valleys, ridging gutters, flashings and finials.

(Continued on page 80)

Let our free plans land jobs for You

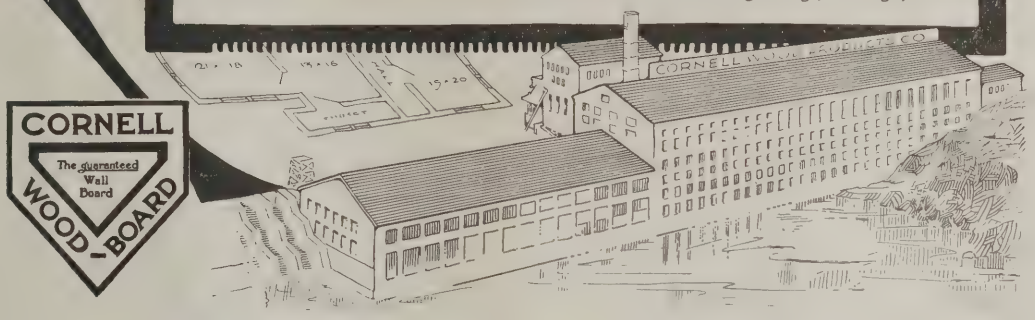
Send us a sketch or blue print of your next job. We will return it promptly with a set of plans showing you exactly the wonderful panel effects you can secure by the use of

Cornell-Wood-Board

WALLS AND CEILINGS

We will also give you complete specifications and approximate cost of material needed. This service is absolutely free, and implies no obligation on your part. We do this because we want every builder to know what can be done with this new and wonderful wall and ceiling material. Write us to-day and let us help you get that job you are bidding on.

CORNELL WOOD PRODUCTS CO., 306 Insurance Exchange Bldg., Chicago, Ill.



Building Construction and Superintendence

By FRANK E. KIDDER, C. E., Ph.D.
Architect

Part I.—MASON'S WORK, Ninth Edition

Thoroughly revised and enlarged by Thomas Nolan, Prof. Arch., University of Pennsylvania. A most exhaustive treatise on masonry construction for buildings in all its branches. New chapters on fire-proofing and concrete, plain and reinforced. Foundations have received careful consideration, and the most approved work in recent structures is clearly illustrated.
964 pages, 628 illustrations, cloth. Price, $6.00

Part II.—CARPENTER'S WORK, Ninth Edition

Treating on Wood Framing—sheathing, windows, outside door frames, interior woodwork, rough work, finish, heavy framing, builders' hardware, and the large variety of detail that the subject covers.
910 pages, 830 illustrations, cloth. Price, $6.00

Part III.—TRUSSED ROOFS and ROOF TRUSSES, Second Edition

This part describes nearly every type of roof construction commonly met with in buildings, pointing out the advantages of different types of wooden and steel trusses for different spans and building requirements. Special attention is given to description of wooden trusses and steel trusses, in order to make the work of practical value to the architect, draughtsman and builder.
294 pages, 306 illustrations, cloth. Price, $3.00

The Set Complete - $13.50

Building Age Book Dept.

239 WEST 39th STREET, NEW YORK



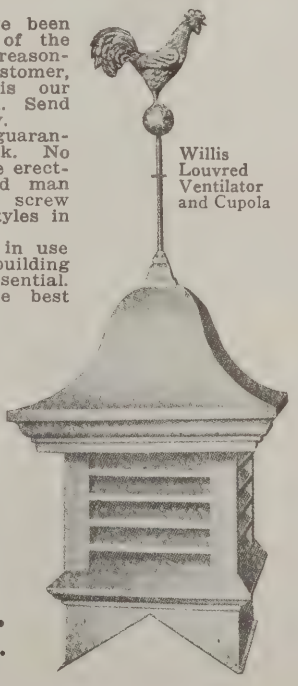
Willis Ventilators and Skylights

For 23 years we have been producing these goods of the highest quality and at reasonable prices. "Once a customer, always a customer" is our slogan. It applies to you. Send us an order and find why.

Willis Skylights are guaranteed not to sag or leak. No putty—no solder. Can be erected by an inexperienced man with a hammer and screw driver. We make all styles in all sizes.

Willis Ventilators are in use on every kind of a building where fresh air is essential. They are made of the best quality of sheet metal, combined with skilled workmanship. They come in all styles and sizes, and are storm and bird-proof.

Our big catalogue shows our complete line of ventilators, skylights, fire-proof windows and doors, metal roofing, ceilings, store fronts; in fact everything in Sheet Metal Building Material. Ask for it.



Willis Louvred Ventilator and Cupola

Willis Mfg. Co.

Galesburg Ill.



Fiberlic

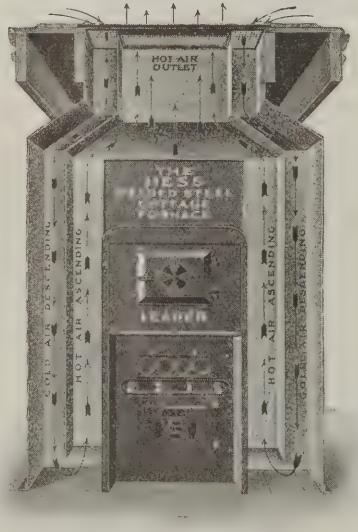
For Walls and Ceilings

This picture illustrates but one of the new and distinctive effects that can be inexpensively secured with FIBERLIC.
FIBERLIC is made from long, tough, imported root fibre. It is chemically treated to insure strength, durability and rigidity; odorless, sanitary and fire resisting. FIBERLIC is nailed right to the studding, and is far cheaper than lath and plaster. It can be used for any surfacing and offers an endless variety of effects.
Send for a sample of FIBERLIC and give it a thorough test, also ask about the special FIBERLIC paints and stains.

THE FIBERLIC COMPANY, Camden, N. Y.

New England Branch:
140 Washington Street, Boston, Mass.
New York Branch:
Fuller Bros. Co., 139 Greenwich Street.
London (England) Branch:
MacAndrews & Forbes, Ltd., Finsbury Court, E. C.

The Pipeless Furnace



For Cottages, Bungalows, Churches, etc., and Stores. The warm air comes up through the center of one large register and the cold air flows down at the ends.

Costs no more than a base burner; takes less fuel. Circulates the heat better than stoves or radiators. Every seam welded. Gas and dust tight. Burns any fuel.

We sell on easy terms if desired and make special rates to Contractors, enabling them to handle it at a profit. Contractors can thus make good profits on this, as a side line, during dull months.

Write for printed matter.

HESS WARMING & VENTILATING CO.
1201 Tacoma Building, Chicago, Ill.

Pettey's "Uniform" Saw Set

What is known as the "Uniform" saw set, a device operated by foot power, thereby leaving the operator's hands free to hold the saw, has just been put on the market by J. O. Pettey of Belvidere, Ill., and a general view of it is shown in Fig. 10. The device may be fastened to the wall with two screws at a height convenient to the workman. For explanatory convenience the equipment has been keyed as follows: 1, tension adjusting screw; 2, frame; 3, tension spring; 4, lever operating the pawl; 5, cord extending to the operator's foot; 6, ratchet; 7, screw for affixing the device to the wall; 8, pawl; 9, plunger, or hammer; 10, positioning spring, for bringing the pawl back to normal position; 11, guide plate; 12, stop pin; 13, anvil. The saw is placed on the anvil with the tooth to be set located directly against the notch in the guide plate, and raised to come in contact with the stop pin. An upward and downward motion of the operator's foot causes the lever to operate a pawl and ratchet, causing the plunger to strike a sharp blow and return to its former position ready for the next blow. The desired force of the blow is obtained by means of the adjusting screw, which is locked in position by means of the staple which fits over the frame at the back. The required angle of the set is obtained by raising or lowering the stop pin. A bent stop is furnished for use in setting narrow band saws. For ordinary work the pin should be turned outwards.

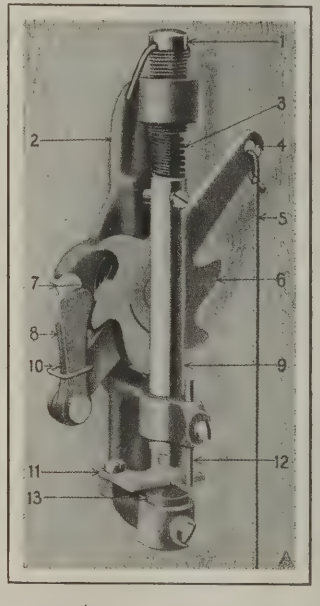


Fig. 10—Pettey's "Uniform" Saw Set

The anvil has four different surfaces, making it adaptable to different sized teeth. The parts of this saw set are made of the best materials, being furnished in white nickel plate to enhance the appearance and to prevent rusting. The price of the outfit is extremely reasonable, and a five days' free trial is offered by Mr. Pettey as evidence of its merits.

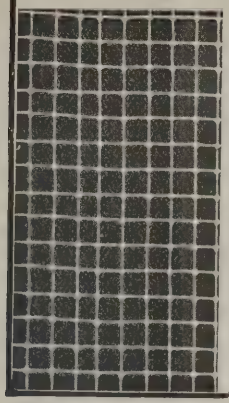
Catalog of Woodworkers' Tools

A catalog and price list of woodworkers' tools, including band saws, boring machines, jointers, swing saws, drills, tenoning machines, saw tables, etc., and consisting of eighty-eight pages of profusely illustrated descriptive text is being sent out by the Silver Mfg. Company, Salem, Ohio, and with New York office at 71 and 73 Murray Street. The matter is arranged in a way to interest the practical woodworker and the information given is directly to the point. One of the recent additions to the company's line is a swing cut-off saw having cored frame in one piece and is intended to be suspended from the countershaft close to the hangers in such a way that its weight does not bind or interfere with the free movement of the pulleys. The saw is of machinery steel 1½ in. in diameter, and the shield for covering the saw and protecting the oper-

(*Continued on page 82*)

Let Your Specifications Read

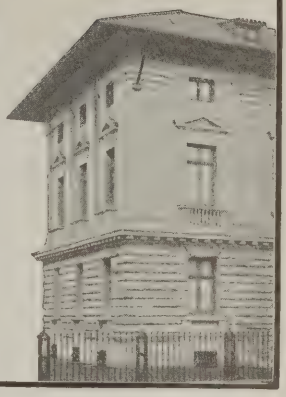
Wright Wire Lathing



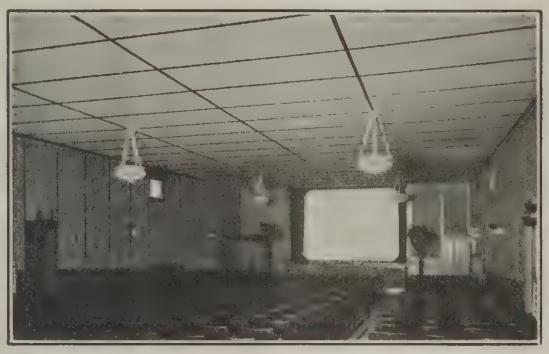
Many of the country's foremost architects specify Wright Wire Lathing. It was used in the Grand Central Station and many other famous structures, because it resists the ravages of time and fire as no other lath can.

Wright Wire Lath is made in three finishes — Plain, Japanned and Galvanized. The illustration at the left shows Wright Galvanized Lath. For strength, rigidity and durability it has no superior.

Our Catalog X, describing Wright Wire Lathing in detail, is an intelligent guide for architects and builders. Free on request.



WRIGHT WIRE COMPANY, Worcester, Mass.



Hard, Stiff, Waterproof and Sized

Try to bend a piece of it. Whittle it. Drop water or ink on it. Rap it on your knuckle.

Then you'll understand how PLASTERGON WALL BOARD differs from all other boards.

PLASTERGON WALL-BOARD

TREATED WOOD FIBRE

The Chemically Treated Wall Board That Does Not Shrink

For every kind of building, PLASTERGON WALL BOARD is best because it is absolutely dependable. It is hard and stiff enough to lay smooth over studs and joists WITHOUT WAVING.

Dampness has NO EFFECT on it, and the waterproofing not only "lumberizes" the board, but also sizes it, saving you from $4.00 to $6.00 per thousand.

BUT DON'T TAKE OUR WORD FOR THIS. Get samples of WATERPROOF Plastergon, test them and then order some of the board. The price will surprise you. Send today.

PLASTERGON WALL BOARD CO., 102 Fillmore Ave., Tonawanda, N. Y.

Specify "CREO-DIPT" Stained Shingles

We are responsible for both quality of shingles and permanency of even colors as ordered.

Save the waste, muss and bother of staining-on-the-job, the labor, cost and time in handling.

We use only selected, seasoned British Columbia grades cut from live timber—no wedge shapes. Pure creosote, linseed oil and earth pigment stains that we grind and mix ourselves.

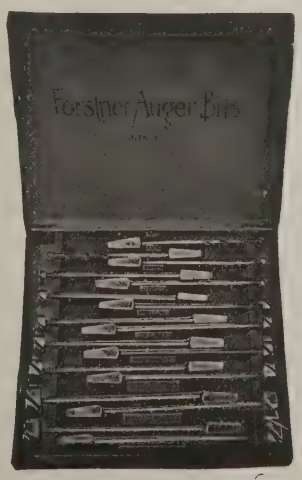
Write for Catalog and full particulars. Book of "CREO-DIPT" Homes. Sample colors on wood.

Make your Lumber Dealer carry three standard colors in stock.

STANDARD STAINED SHINGLE CO.
1030 Oliver Street, N. Tonawanda, N. Y.
(Factory in Chicago for Western trade)



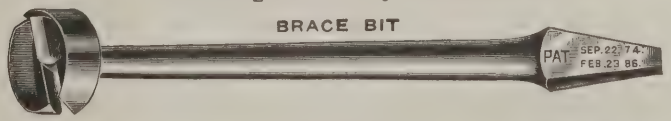
Architects: Smith, Hinchman & Grylls, Detroit, Mich.
"CREO-DIPT" Stained Shingled roof harmonizes with Brick



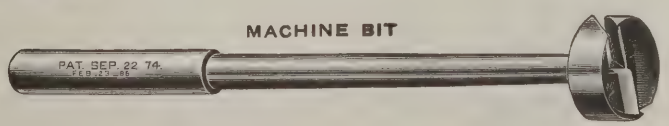
THE "FORSTNER" LABOR SAVING AUGER BIT BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT



MACHINE BIT



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.

Use Stanley's No. 1775 Wrought Steel Garage Door Stay and Close the Doors with One Hand from Inside the Garage



MADE of 1-inch angle iron, it has great strength and leverage. Throwing the door open sets the stay, and a slight pull on attached chain releases the lock and draws door shut. Weight 8½ pounds per pr.

Write for descriptive circular "E."

MADE BY THE
STANLEY S.W. WORKS
NEW BRITAIN CONNECTICUT
NEW YORK CHICAGO
HINGE HEADQUARTERS

A Stairway That Disappears When Not in Use

A stairway that is ready at moment's notice when needed and quickly put out of the way when not in use.

Combines all the advantages of the stationary stairway and does away with the waste of floor space in the room below necessary with the old type.

Designed originally to be used from the second floor to the attic, it has been used in bungalows, office buildings, hospitals, schools, etc.



Cut shows stairway half way down.

Cut above shows stairway when not used.

When stairway is in this position a light touch on the lower stringer slides it down panel and onto the floor.

Don't plan any work for the coming season without first investigating *The Bessler Movable Stairway*. This is a proposition for the progressive builder.

A postal will bring full particulars.

The BESSLER MOVABLE STAIRWAY CO.
Dept. 1
Akron, Ohio

ator is made of cast iron securely bolted to the main frame in such a way that it can be quickly removed when desired. The floor space required for the saw is only 50 x 42 in., and the power necessary varies from 5 to 7 hp. Silver's new jointers made in five sizes are also features of the catalog.

A New Sheet Metal Concern

Under the name of the Cincinnati Can Company, there was incorporated at Columbus, Ohio, Nov. 23, by the interests identified with the Edwards Mfg. Company of Cincinnati, Ohio, a new concern which will manufacture a line of sheet-metal specialties, including oil cans, ice-cream freezers and other miscellaneous goods. The new concern is a consolidation of several small companies, the plants of which are located in other cities. The principal concerns taken over are the Eureka Specialty Company, which has a plant at Ludlow, Ky., and another plant at Greenfield, Ohio. The new concern will occupy the factory buildings in Cincinnati, Ohio, at Carthage Pike and the Big Four Railroad, formerly occupied by the Cellular Metal Company, the property belonging to the Edwards interests. New additions will be made to the plant and a force of 200 men will soon be employed.

E. W. Edwards, president of the Edwards Mfg. Company, will be president of the new concern, H. W. Edwards will be vice-president, O. S. Larby will be secretary, G. D. Myers will be treasurer, J. C. Miller superintendent, H. A. Greening sales manager.

Demand for "Northwestern" Concrete Mixers

Walter H. Kestin has been appointed sales manager for the concrete machinery department of the Northwestern Steel & Iron Works, Eau Claire, Wisconsin. This addition has been made necessary by the marked increase in the demand for Northwestern mixers and the return of activity in the building lines. Thorman W. Rosholt, vice-president of the company, who has heretofore devoted a portion of his time to this work, will in the future devote more of his time to work among the trade. E. R. Hamilton, secretary and general manager, states that they have had a substantial increase in the business during the past twelve months and that present indications seem to insure still greater gains for the coming year.

TRADE NOTES

E. W. Edwards, president of the Edwards Mfg. Company, Cincinnati, Ohio, has been selected as one of the five members to serve on the Rapid Transit Commission of that city. He was a member of the original commission and was reappointed, also elected president of the Board, which speaks highly for the esteem and regard in which he is held by his fellow members.

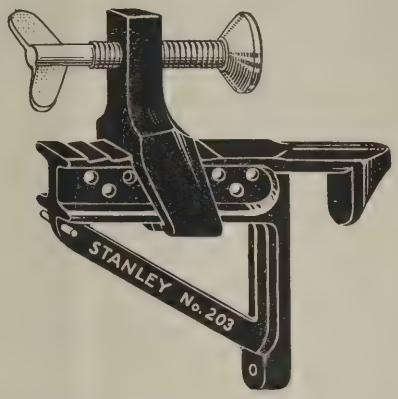
"Building for the Future" is the title of a handsome *brochure* which is being sent out by the Marquette Cement Mfg. Company, Chicago, Ill. It is made up for the most part of handsome reproductions from photographs of work in connection with which Marquette Portland cement was used.

To insure a consistently fireproof structure throughout, Johns-Manville Corrugated Asbestocel sheets were specified for insulating the walls, ceilings and floors of the three humidifying rooms for the storage of cigars in the new plant of the Parodi Cigar Company, Jersey City. One-inch Asbestocel sheets were finished with ⅛-in. asbestos board, coated on the face side with Liquid Vitrex Cement. Six thousand square feet were necessary for the purpose.

E. C. Atkins & Co., Indianapolis, Ind., has recently enlarged its list of products by more than 50 items, which are listed in its new catalog. The illustrations are excellent and the descriptions are complete. The catalog describes the company's line of saws, saw tools, scrapers, cement tools, bit braces and tool specialities.

(*Continued on page* 84)

Stanley Tools



Stanley Bench Bracket
No. 203

A tool that will immediately commend itself to the Carpenter, the Cabinet Maker or in fact to any one occupied or interested in carpentry or woodworking of any kind where a bench is necessary.
It simply requires that one or more holes (not smaller than one inch) be bored in the front of the bench. The shape of the tool is such that when the jaw or nose is put through the hole, it is automatically held in place, and by means of the screw clamp, the board being worked upon, is quickly and firmly secured.
The body of the Bracket is made of iron—japanned—and the clamp screw is strong, well threaded and nickel plated.

PRICE EACH 35 CENTS

Send for special circular showing several ways in which this handy little tool can be used.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Carpenters— Contractors— Do This



Carpenter's Adze

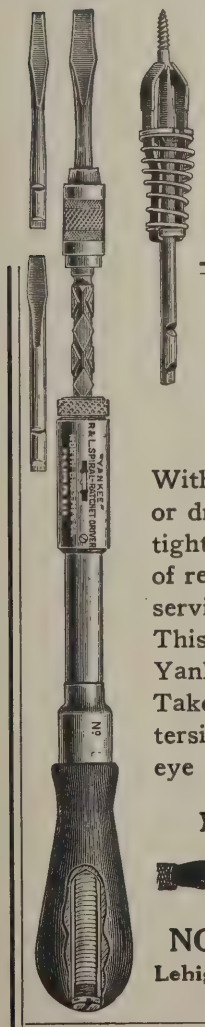
Now, that you have a little spare time, send for our Carpenters' Catalogue showing tools that you have often heard of—the famous

White Tools

They will not only save you money but your work will be better and a mighty sight easier. What tools cost when new is of less importance than how long will they last and will they stay sharp.

Do it now, before you forget

The L. & I. J. White Co., 100 Perry St., Buffalo, N. Y.



Look at This

"YANKEE" No. 131
Large Size
QUICK RETURN
With Spring in Handle

A quick and powerful tool for house carpenters. Drives most any size screw, large or small, and in about one tenth of the time of an ordinary driver. With the screw holder you can drive or draw a screw 3 feet overhead, in tight corners or most any place out of reach. Besides, you get the same service as with the Yankee No. 31. This is the quickest and strongest Yankee Driver made.
Takes the drilling attachment, countersink, screw holder bit and screw eye bit used in the No. 31.

Your dealer can supply you

Let us send you the "YANKEE" Book. A postal brings it

NORTH BROS. MFG. CO.
Lehigh Ave. Philadelphia, Pa.



For Just Such Jobs as This—

Jobs that are very frequent, as every carpenter knows.
Outer sleeve of this extension bit-holder telescopes over inner spindle. Chuck has four strong steel jaws that grip firmly over shoulders of bit stock shanks.

MILLERS FALLS
EXTENSION BIT HOLDER No. 6

Follows bits 5/8 inch or over into bores. Length extended 24 inches, collapses to 16½ inches, making it handy to carry.
Ask your dealer to let you see it and at the same time, Millers Falls quality Bit Braces, Nos. 732, 872, 772. Examine our whole line and perhaps you may find it to your advantage to standardize your tools.
We have a handy pocket catalogue. Send for it.

MILLERS FALLS CO., Millers Falls, Mass.
"Toolmaker to the Master Mechanic"
and 28 Warren St., New York



BAYONNE Used on All the Porches

(Gedney Farm Hotel, White Plains, N.Y.)

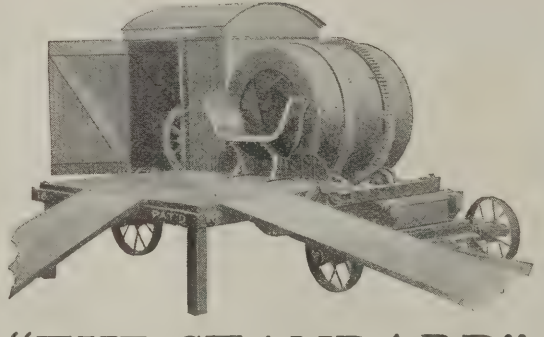
Builders and contractors give preference to BAYONNE where wearing qualities, clean finish and economy are essential. BAYONNE gives complete satisfaction where other prepared materials and even metal coverings fail.

It is the simplest covering to lay; tacked only on the edges after spreading on the *dry boards* (no setting in wet paint). Does not shrink, expand, buckle or crumble. It *stays flat.* Never leaks and stands any amount of hardest wear. One coat of paint is sufficient for ordinary uses.

Hundreds of letters from contractors all over the States prove BAYONNE'S superiority

Write for Sample Book "D" giving prices and laying instructions. See Sweet's, Page 539.

JOHN BOYLE & COMPANY, Inc.
112-114 Duane St. NEW YORK CITY 70-72 Reade St.
Branch House: 202-204 Market St., St. Louis, Mo.



"THE STANDARD" LOW-CHARGING CONCRETE MIXER

will enable you to rush your concrete work before cold weather and save you ⅓ in operating time and labor. The mixing drum is charged with wheelbarrows direct from platform only 24" high—no side loader or high charging hopper necessary.

The semi-automatic dumping device insures quick discharge of mixed concrete, and the light weight enables outfit to be moved to the most convenient location on the job for handling your materials economically.

Investigate Low-Charging Now. It saves you ⅓.

Write for Complete Catalog No. 48-1

THE STANDARD SCALE & SUPPLY CO., Mfrs.

1345-47 Wabash Ave. CHICAGO
243-245 Water St. PITTSBURGH
136 W. Broadway NEW YORK
35 So. 4th St. PHILADELPHIA
1547 Columbus Road CLEVELAND

The book is bound in stiff green covers 7½ x 19½ in., and contains 248 pages.

Blaine S. Smith, general sales manager of the Universal Portland Cement Co., Chicago, was elected general secretary of the Chicago Association of Commerce at the annual meeting, Dec. 8. He has served the association actively for several years as chairman of the Illinois committee and until now as chairman of the Ways and Means Committee Council.

The James Swan Company, Seymour, Conn., was awarded a Medal of Honor on mechanics' tools at the Panama-Pacific International Exposition, which recently closed at San Francisco, Cal.

Simmons & Simmons have opened an office in the Monger Block, Elkhart, Ind., for the practice of architecture and would be glad to receive samples and catalogs from manufacturers of builders' materials.

The business of the Standard Pump & Engineering Company, Cleveland, Ohio, builders of pump equipment for water supply systems for residences, has been taken over by the Adamson Machine Company, Akron, Ohio. The plant will be removed from Cleveland to Akron.

The Globe Iron Roofing & Corrugating Company, Cincinnati, Ohio, is sending out a very attractive pamphlet relating to Globe metal shingles which are made in three different styles and can be furnished in either painted or galvanized steel. The point is made that these shingles are suitable for any building with a pitch of 3 in. or more to the foot; that they are economical as regards cost; are fireproof, thus involving a lower rate of insurance on buildings where they are used and will not break or come loose from any cause. Their construction is such as to fully provide for contraction and expansion.

Hoggson Bros., who under one contract for the work complete a building operation from the furnishing of the architectural plans through to construction, equipment, decoration and furnishing, have leased and occupy the entire tenth floor of the building at 485 Fifth Avenue, New York City, where they will have a total of 3½ acres of floor space. The concern was founded in 1889 and incorporated in 1907. It outgrew its quarters twice, hence the removal to the present location and commodius quarters.

Aberthaw Construction Company, specialists in concrete, has just removed its offices to more commodious quarters in the newly erected Niles Building at 27 School Street, Boston, Mass.

Hecla Iron Works and the Winslow Bros. Company were merged in 1913 under the name of Hecla-Winslow Company, Inc. The purpose of the merger was chiefly to effect economies by joint operation. Announcement is made in a circular just issued that it has been demonstrated that such economies have not been obtained and, therefore, "in a mutual and friendly spirit it has been decided to reinstate the two companies under their original names, owenership and management as of Sept. 1, 1915." The circular is signed by Hecla Iron Works, New York, established 1876, and Winslow Bros. Company, Chicago, established 1885.

One of the latest issues of DooR-Ways—the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill.—has an article dealing with the handling of material with R-W overhead trolley and I-beam carrying equipment; also some comments on hanging heavy doors and the advantages and conveniences of sliding doors in the modern home.

Bird & Son, East Walpole, Mass., are sending out a folder printed in colors upon tinted paper announcing the fact that they have now added a "colored surface" to their Neponset asphalt shingle. The present gray-surfaced Neponset shingle on the market is built, they point out, on the right principle and is most durable

(Continued on page 86)

When a Wall Tie is a Wall Tie it is the Whalebone



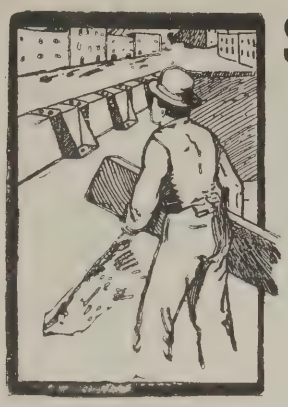
Made in any length from five inches to fifteen inches. Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.

Price on standard size, based on 21 gauge material, $4.00 Pittsburgh per M. Shipments made same day order is received.

Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pounds to M to 85 pounds to M, according to thickness of material.

Allegheny Steel Band Co.

BELL PHONE: 718 Cedar. North Side: PITTSBURGH, PA.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

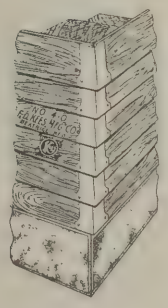
The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

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KEES Metal Building Corners

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CHAINS

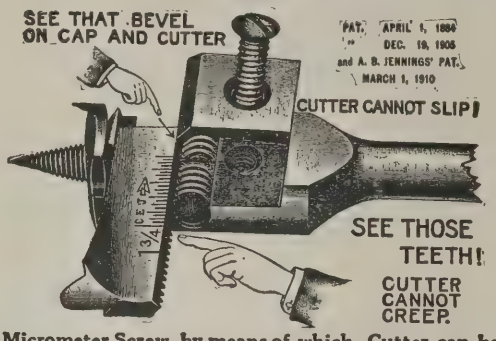
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EXPANSIVE BIT

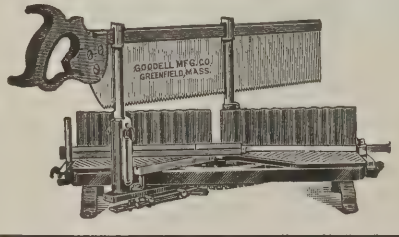


Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

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No Cast Iron Here

This Mitre Box is **All Steel.** Not an ounce of cast iron in it. What's its name? Why, the **Goodell,** of course.
Steel Truss Frame or Bed, Cold Rolled Steel Corrugated Back, Wrought Steel Lever or Saw Support. Automatic Detents for Holding up Saw. Steel Bottom Plates with Angular Serratures. Long Saw Guides and Many Other Features.



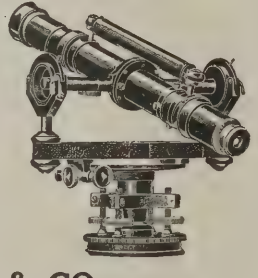
Write for new *Circular K* describing the box that cannot break.

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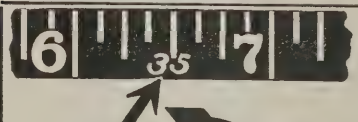
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in its construction, but they have now added a layer of crushed slate—red or green—to both sides of this double width, built up, heavy butt Neponset shingle which fills the demand for a colored shingle. The makers will be glad to furnish those interested information telling how they can establish themselves as shingle headquarters in handling "the greatest roofing development of the twentieth century."

We are indebted to the Crescent Portland Cement Company of Wampum, Pa., for a copy of the reprint of a Portland cement booklet which was originally published about 1883. It was issued by the Wampum Cement & Lime Company, Ltd., "manufacturers of Shinn Bros., centennial Portland cement, equal in quality to the best brands of English, German and French Portland cement, made by the same process and possessing the same chemical analysis." This appeared over the name of "John K. Shinn, Secretary and Treasurer, New Castle, Lawrence County, Pa." This original copy was recently discovered by the Crescent Portland Cement Company among some old documents, and is, so far as they know, the earliest pamphlet of its kind in America.

The latest issue of the *Disston Crucible*—a magazine for the millman, and published by Henry Disston & Sons, Philadelphia, Pa., contains the usual amount of interesting matter along the lines indicated. There are comments on grindstones, a description of the "greatest lumber mill in the northwest," some comments regarding hard woods and their uses, together with safety regulations for stored lumber. Not the least interesting feature is an excellent likeness of Frank Disston, president of the Disston Company.

Leo W. Schaefer has opened an office for the practice of architecture in the Terrahe Building, St. Cloud, Minn., and would like to receive catalogues and samples from manufacturers of materials entering into building construction.

Some very interesting information relating to Reynolds asphalt shingles and accompanied by a number of half-tone engravings of buildings on which they have been used is contained in a recent issue of the house organ of the H. M. Reynolds Asphalt Shingle Co., Grand Rapids, Mich.

W. A. Ives Mfg. Company, Wallingford, Conn., and 86 Warren Street, New York City, has recently added to its extensive line the "Mephisto" chisels and braces. Its new goods are said to carry the same guarantee as the "Mephisto" bits.

"The Technician" is the name of a monthly Bulletin devoted to the professional interests of technical men which has just been published by Associated Technical Men, Inc., 1215 Monadnock Block, Chicago, Ill.

The Harvey Company is the name of a concern which has been incorporated under the laws of the state of Maryland for the purpose of selling supplies and equipment directly to building-contractors, industrial establishments, etc. The office and warehouse is at 113 South street, Baltimore, Md.

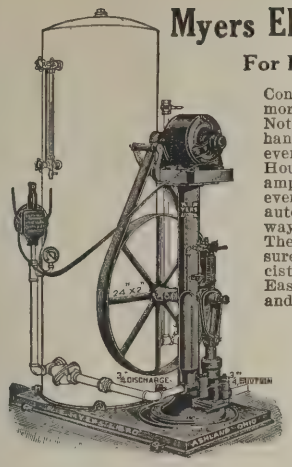
J. H. Lendi, formerly assistant to A. G. Carlson, Mechanical Engineer, Universal Portland Cement Co., has been given the title of Electrical Engineer in the Engineering Department of that company.

Bird & Son, East Walpole, Mass., are sending out a folder relating to Neponset floor covering, which in appearance resembles printed linoleum. The base, however, is waterproof all the way through, and consequently is sanitary and more durable than would otherwise be the case. The folder carries twenty-two

(*Continued on page* 88)

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For Home Water Supply



Conveniences for the household are more in favor than ever before. Nothing is more appreciated than a handy water supply, for water is an everyday necessity. Myers Electric House Pumps will furnish water in ample quantities, without labor and even without attention, for they are automatic in operation and will always keep the supply tank filled. They may be used wih open or pressure tanks. Will pump water from cisterns or wells of any depth. Easy to install, economical to operate and satisfactory always.

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Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

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Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 3d galvanized No. 13 gauge 1¼ inch wire nails.

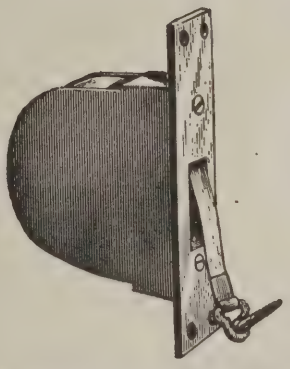
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Does away with weights and cords and VASTLY more durable.

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Permits greater window space in new work, as box frames are not necessary.

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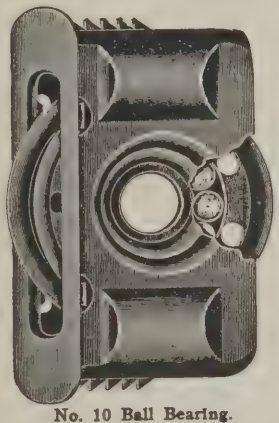


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The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

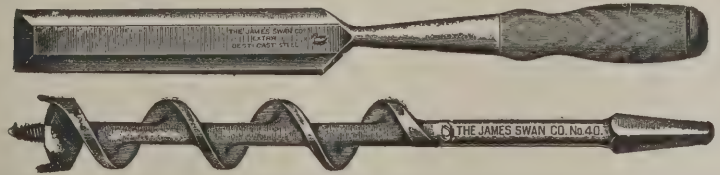
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HESS MEDICINE SANITARY CABINET LOCKER

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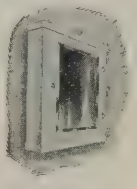
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



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The sure, dependable, economical water-proofing for all concrete, cement and stucco work.

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Send 10¢ for this Big Book

Are *you* snatching after pennies and losing dollars? A lot of carpenters and builders are who do work outside their regular work to keep money coming in. YOUR REAL WORK IS BUILDING. Why don't you devote spare time to laying out plans to sell to customers in the spring and summer? You will find many plan suggestions in the Hewitt-Lea-Funck Prize Plan Book. Over 100 good homes shown, with exterior views, floor plans, detailed specifications and guaranteed quotations. No dollar book so practical and helpful, yet this costs you only 10 cents, because part of Hewitt-Lea-Funck Service to lumber users.

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patterns of floor covering, all printed in colors showing the exact appearance of the material.

The heating question is one of all-absorbing interest to the building contractor and house owner, and anything which will tend to reduce the coal consumption, and thereby the fuel bill, is a proper subject for consideration. They are therefore likely to find profit in an investigation of the merits of the Williamson Newfeed Underfeed furnace or boiler made by the Williamson Heater Co., 432 Fifth Avenue, Cincinnati, Ohio. The claim is made that its great economy and comfort is produced by reason of the fact that it burns the coal on the "candle" principle. All fuel is fed from below, thus keeping the fire always on top. The company states that the Underfeed burns the cheaper grades of coal just as effectively as some other heaters burn the more expensive grades and that is a first great saving, of which the owner can be sure. An interesting book entitled "From Overfeed to Underfeed" has been issued for free distribution and readers can secure copies on application to the company.

The builder who may have trouble in deciding as to the best material with which to cover a porch or deck roof, cannot fail to be interested in what is known as the "Bayonne" brand of cloth for this purpose made by John Boyle & Co., Inc., 114 Duane Street, New York City. The point is made that the material is very easily laid; that it is tacked only on the edges after spreading on the dry boards; that it does not shrink, expand or buckle, but stays flat. Another point which is made for it is that one coat of paint is ample for ordinary uses. Readers interested can secure a copy of "Sample Book D," which gives instructions for laying by writing to the above address.

The National Lead Co., with headquarters in New York and branches in many of the leading cities of the country, has prepared for distribution to interested readers "General Painting Specifications" and a chart of 39 color treatments. Those desiring the matter should write for "Folders C." The company calls attention to the fact that for durable painting of all kinds the architect and owner should specify "Dutch Boy White Lead," as it shrinks and stretches without cracking. It also anchors itself into the pores of the wood, wears well and presents a good appearance.

The Waukesha Motor Co., Waukesha, Wis., is making additions to its heating plant building which will contain a new experimental department. The buildings will be of structural steel and brick, with skylights and composition roofing.

Warren & Goin, architects, Gainesville, Fla., have dissolved partnership, but the business will be continued at 11 and 12 Baird Building by Mr. Warren. Mr. Goin severed his connection to engage in contracting.

Dahlstrom Metallic Door Company has recently located its New York City offices and show rooms on the fifth floor of the new office building at 130 East Fifteenth street. The show rooms are not confined to a *suite* of offices, but embrace the entire 20-story and basement building which is equipped throughout with the Dahlstrom products.

A new type of construction consisting of a steel frame with metal lath, stucco, concrete and plaster is being brought to the attention of architects, builders and contractors by the Trussed Concrete Steel Company, Youngstown, Ohio. All wood is entirely eliminated in the structural parts of the building and the claim is made that the construction can be erected more rapidly and easily than even the simplest wood construction. An illustrated pamphlet sent out by the company gives full particulars regarding the system and numerous illustrations clearly indicate the parts which are utilized in the frame work. The statement is made that the only tool required is a hammer.



The Building Age

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Waterproofed Parquetry

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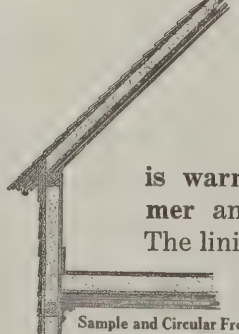
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The Building Age

NEW YORK, FEBRUARY, 1916

A Western Type of Two-Family House

A Striking Exterior Finished in Rough Stucco with Roof Covered with Gray Asbestos Shingles

THERE is abundant evidence to be gathered from architects and builders who specialize in moderate-priced construction in the Middle West that the two-family apartment building has come to stay. In recent years landowners in city and suburb have realized that a plot of ground may be well utilized to accommodate the needs of two families without incurring what might be considered a prohibitive cost for construction and upkeep as compared with a modern residence. In the well-designed structure of this type the owner sacrifices none of his home comforts, while at the same time he is assured of an income from the rented portion of the home which makes his own apartments practically rent free. An excellent example of a house of this type has been selected as the basis of this article, principally because of its moderate cost, attractive appearance and

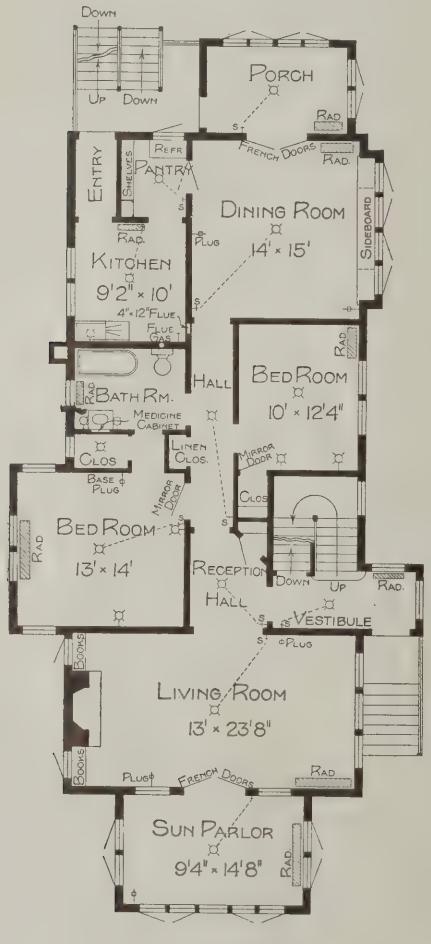


View in Dining Room of Two-Family House Looking Toward the Enclosed Porch at the Left

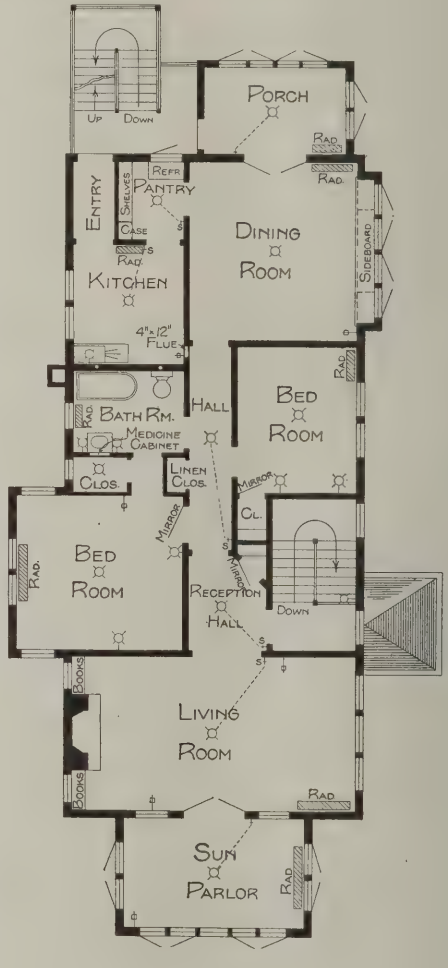
commodious arrangement of five rooms to each floor. Another important feature is that of the application of asbestos stucco and asbestos shingles which tend to prevent the building suffering severe damage in the event of a conflagration.

The house has a southern frontage and one of the accompanying pictures taken from the southeast shows a combination of brick and stucco with half timber treatment which is decidedly pleasing. The entrance on the east side gives access to both apartments. It is reached by ten stone steps, which terminate in a wide platform, the arrangement being graced by an iron railing on the exposed side. The front door opens into a vestibule which has a floor tiled to imitate an Oriental carpet. The first floor apartments are directly off this hall, three sections of almost equal proportions. From the front, the first section is made up of the sun parlor and living room, the second of the reception hall, two bedrooms and a bathroom, and at the rear are dining room, an enclosed porch, a kitchen and a pantry.

The living room is 24 x 13 ft. in area, and at the west end of it is a cosy brick fireplace, flanked on either side by a bookcase. A shelf above has been provided for such decorations as small lamps and vases. Windows at both ends of the room provide an abundance of natural light, a feature which is greatly assisted by the large amount of glass surface in the sun parlor to the south. The sun parlor is reached from the living room by French doors. It is approximately 15 ft. long and



First Floor Plan



Second Floor Plan

A Western Type of Two-Family House—Floor Plans—Scale 1/16 *In. to the Foot*

while an inner door leads to the basement. Two flights of stairs, well lighted by landing windows, rise to the second floor and are continued to the attic. A basement under the entire building contains two store rooms, a laundry, a toilet room, coal and boiler rooms, and a section which may be used in the future as a billiard room.

Exclusive of the front and rear porches the building is 56 ft. long and approximately 25 ft. wide. The sun parlor in the front and breakfast porch in the rear extend 10 ft. and 8 ft. respectively, making the total length 74 ft.

On entering either apartment the visitor finds a reception hall, to the right of which is a roomy clothes closet. The plan has been divided into 9½ ft. wide. There are nine windows in all, five taking up the greater proportion of the front, while the remaining four are distributed two on each side. A large radiator of the low type is installed on the west side of the porch, so that this room may also be used with comfort during the bleak, cold months of our Northern winters.

A pleasing perspective is presented in the view taken from the sun parlor, looking through the living room and down the hall, at the end of which is the dining room. Off the hall on one side is a guest's bedroom, and on the other the owner's bedroom, communicating directly with the bathroom. Adjacent to the bathroom is a linen closet with four shelves.

Another of our pictures shows the dining room with the breakfast and sewing porch beyond, both rooms being exceptionally well lighted. The former has a large buffet, provided with sufficient drawers and cupboards and a wide sideboard to shelves and three drawers, the location being clearly indicated on the floor plan on the facing page.

A careful examination of the plans will show the close proximity of the fixtures in the kitchen and bathroom, a feature which tends to reduce the

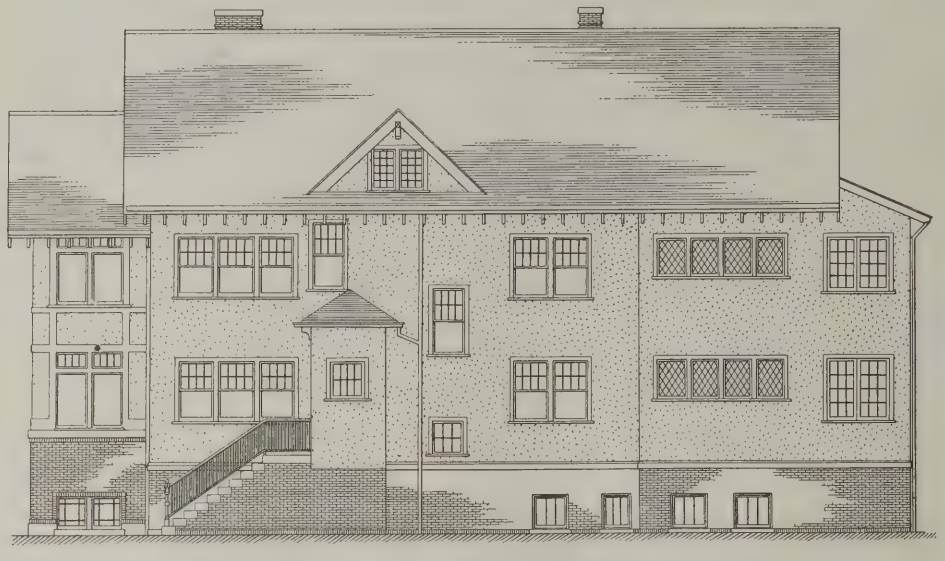


A Western Type of Two-Family House—General View, Showing the Striking Appearance of the Finished Building and also of the Front and Side Elevations

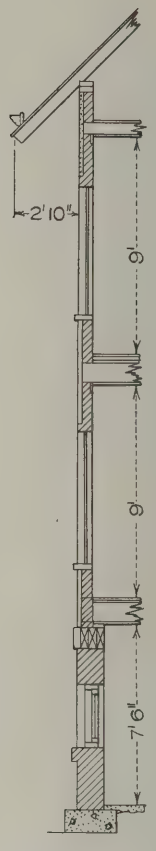
accommodate all the needs of an average family.

The floor plan provides for two rear entrances, one to the kitchen and the other direct to the porch. Between the kitchen and the living room is a pantry containing the ice box and a case with four cost of installation. It will also be noticed that each bedroom has a closet in which electric light connections have been extended. The closet in the main bedroom has a Lowrie wall safe, and the backs of the bedroom doors are mirrored.

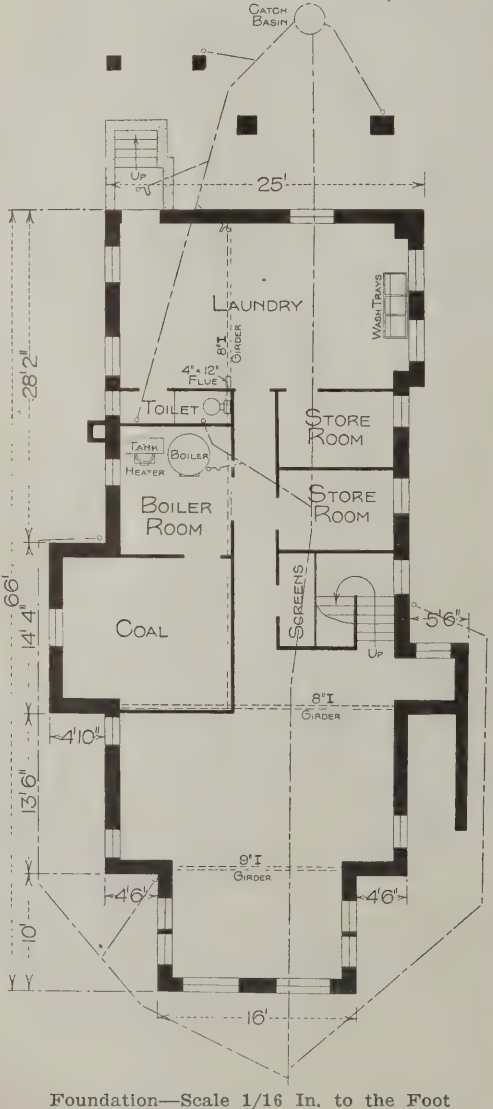
The footings of walls and piers are constructed of concrete consisting of Portland cement, torpedo gravel and small crushed stone in the proportions mortar. All brick work is neatly bonded every sixth course, all joints being well filled with mortar and neatly struck on the exterior and interior. The



Right Side Elevation of the House—Scale 3/32 In. to the Foot



Section—
Scale ⅛ In.
to the Foot



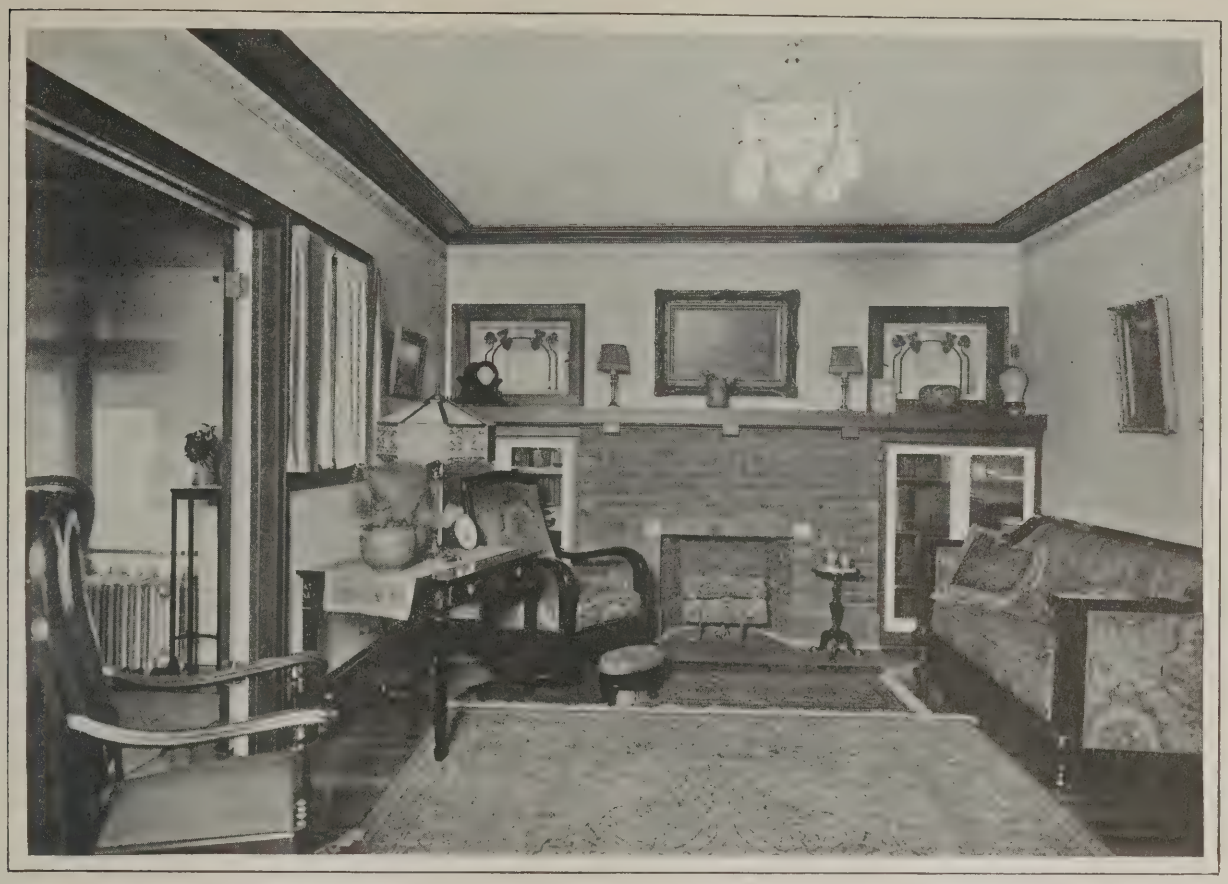
Foundation—Scale 1/16 In. to the Foot



Front Elevation—Scale 3/32 In. to the Foot

A Western Type of Two-Family House—Plan, Elevations and Section

of 1:3:5. The piers are 13 x 13 in., and the footings 2 ft. 4 in. Two courses of paving brick were laid below grade all round the building in cement outside walls and inside of the basement walls are plastered from the foundations to the water table with a damp-course consisting of one part of



View in Living Room Looking Toward the Fireplace Flanked on Either Side with Bookcases

Portland cement and two parts of torpedo sand.

The basement floor was leveled to the required grade and then rough concrete work 3 in. thick was laid, consisting of Portland cement, torpedo gravel and small crushed stone in proportions of 1:2:4, thoroughly mixed and tamped in place. A finishing coat ½ in. thick, consisting of two parts Portland cement and three parts of torpedo gravel, was



A Western Type of Two-Family House—Another View in Living Room with Hall Beyond

added and troweled to a true, smooth surface.

The timbers used throughout the house are of well seasoned No. 1 yellow pine. The joists for the first and second floors are 2 x 10 in., and for the attic are 2 x 6 in. The rafters are also 2 x 6 in., and all are spaced 16 in. on centers. The studding for partitions and outside walls are 2 x 4 yellow pine spaced 16 in. on centers. Sills all round the building are 2 x 10 in. yellow pine, double plates being provided for outside walls and bearing partitions. All openings in the latter are substantially trussed. A 1 x 4-in. ribbon plate is let into the studding to receive the joist in all outside frame walls, the joists being spiked to the studding. A 2 x 4-in. collar beam is nailed to every other rafter.

Each tier of floor joists has two rows of 1 x 4-in. cross bridging, and all bearing partitions are bridged once through the center. Headers and trimmers are hung in iron stirrups let in flush with the top of the joist. The basement partitions are ⅞ x 5½ in. dressed and matched flooring put on diagonally.

The first and second floor joists, attic joists and entire outside walls above the first floor, roofs and dormers, are sheathed with ⅞ x 5½ in. dressed and matched yellow pine. Over this was placed two layers of Neponsit waterproofing paper, on top of which were nailed ⅞ x 2-in. yellow pine furring strips placed 12 in. on centers.

The exterior walls were covered with expanded metal lath of No. 24 gage to receive the cement coat. In plastering the exterior the first coat consisted of one part Portland cement, one part sharp lake sand, a small quantity of lime mortar and hair, well mixed and troweled in place. The next coat was composed of one part Portland cement and two parts of sand. Asbestos stucco made by the H. W. Johns-Manville Co., New York City, was used to produce a rough texture in the final coating.

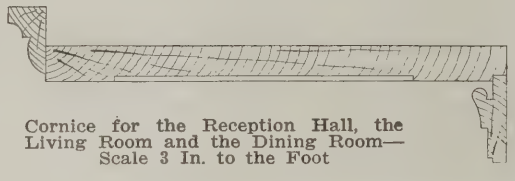
Selected buff Bedford stone was chosen for the front of the building. The railing gracing the front steps has a 3-in. post and a cap rail ⅝ in. square, the balusters being spaced 3 in. on centers. All iron work received one coat of mineral paint before being set up.

The front door is of oak 2½ in. thick, fitted with wooden bars and twelve small panes of glass. In the rear the door is of paneled pine 1¾ in. thick. The basement doors are 5-panel white pine stock, 1⅜ in. thick, excepting the rear entrance, which is 1¾ in. thick.

Above the front stairs to the left of the entrance Corbin combination letter boxes and speaking tubes have been installed. A speaking tube is also carried from each floor to the laundry. A No. 101 "Majestic" coal chute, made by the Majestic Co., Huntingdon, Ind., is visible on the west wall of the building.

All roofs are covered with H. W. Johns-Manville Co.'s asbestos shingles of gray which harmonize with the stucco walls.

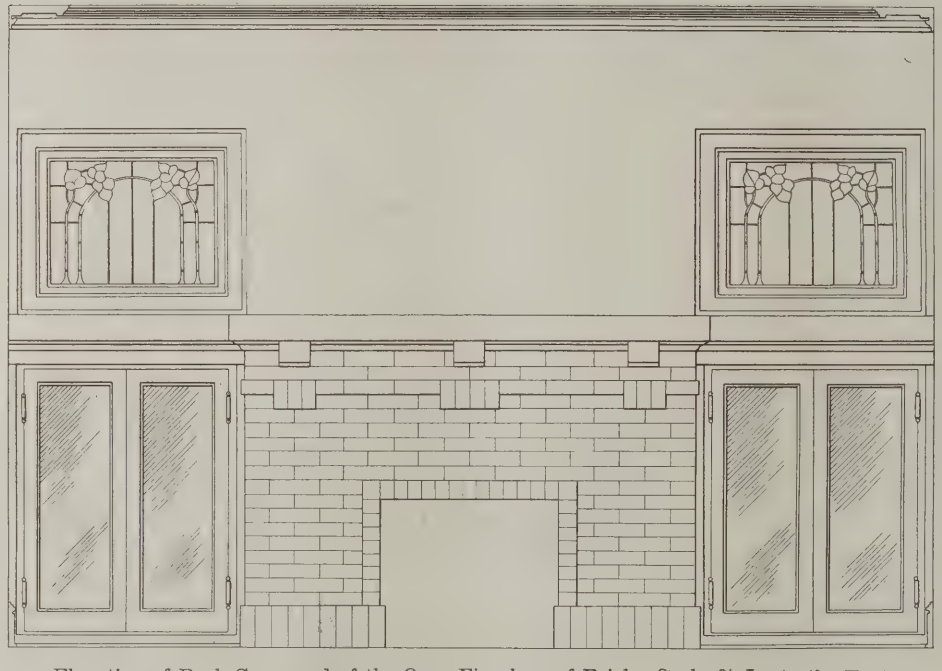
Galvanized iron work throughout is of 26 gage. In addition to the ridges, guttering and flashing, seven corrugated downspouts, each 3 x 4 in., have been put up secured to the building with iron fasteners.



Cornice for the Reception Hall, the Living Room and the Dining Room—Scale 3 In. to the Foot



Casing for Reception Hall, Living and Dining Rooms—Scale 3 In. to the Foot



Elevation of Book Cases and of the Open Fireplace of Brick—Scale ⅜ In. to the Foot

A Western Type of Two-Family House—Various Details of Construction

The chimney located where shown on the plan is faced with selected red pressed brick made by The Hydraulic-Press Brick Co., St. Louis, Mo. The same color and quality face brick was used for the fireplace and hearth in the living room. The chimney is lined with fireclay flue lining and topped with a stone coping. All pressed brick was laid with ¼-in. raked out joints.

All walls, partitions and ceilings on the first and second floors as well as the basement ceiling are lathed and plastered with two coat work. Expanded metal lath was installed over the boiler. The first coat of plaster consisted of a rich lime mortar composed of fresh quick lime, sharp sand and plenty of hair. The second coat was a plaster of Paris hard finish. The bathroom ceiling was plastered with ready mixed "Adamant" cement plaster and has a finish coat of the same material.

The floor strips for both floors are of No. 1 yellow pine. On the first floor they measure 2 x ¼ in., spaced 16 in. on centers, and on the second story 1½ x 2 in. It was specified that for the second floor two layers of "Eureka" heavy deadening felt be laid, one on top and one below the floor strips. One layer of rosin sized paper was laid on top of the first floor.

The dining room has an oak floor and trim; the living room, birch trim with mahogany stain and oak floor; the sun parlor, an oak floor with pine trim, white enameled; the rear porch an oak floor; the vestibule, oak trim; the kitchen, a maple floor; the bedrooms, birch trim, white enameled, with oak floors; the bathroom, birch trim, white enameled; and the hall, birch trim and oak floor.

All flooring is ⅞ x 2½ in. and the oak floors were filled with Wheeler's patented filler, after which were applied two coats of Pratt & Lambert's No. 61 floor varnish. The same treatment was given the treads of inside stairs. Maple floors were treated to one coat of boiled oil and two coats of the above varnish.

All outside woodwork and metal received two coats of white lead and linseed oil paint, the final coats being of selected tints.

All oak trim was treated with Wheeler's patented filler and had two coats of Murphy Varnish Co.'s transparent finish, sandpapered between coats, the last having a dull finish. Birch woodwork re-



View in the Bath Room



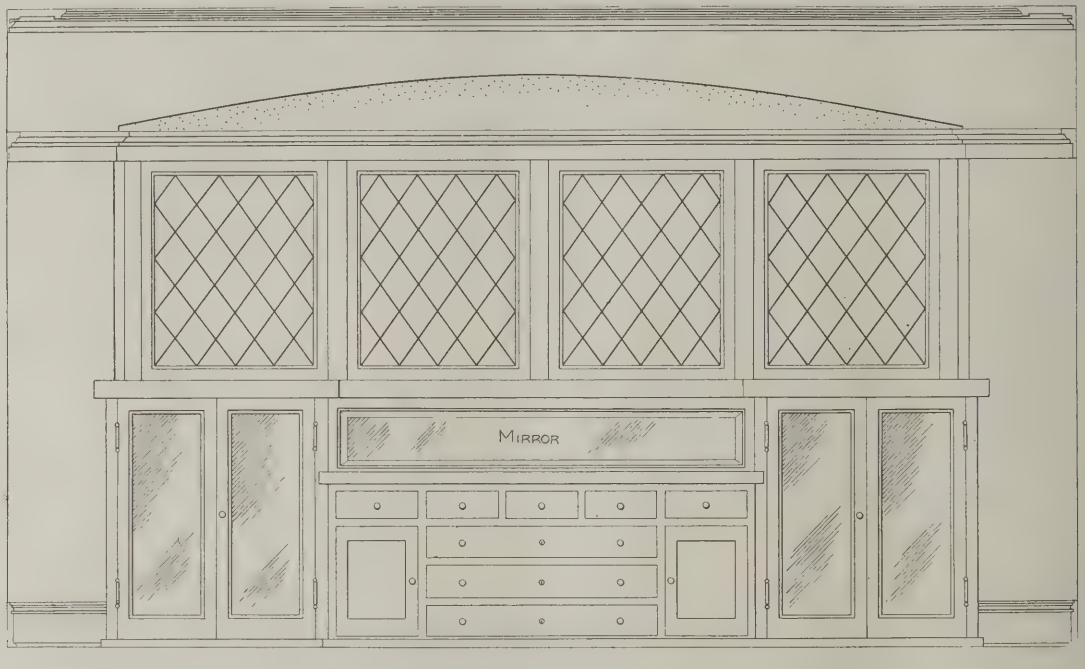
A Western Type of Two-Family House—View of the Side Elevation Showing Picturesque Setting

ceived one coat of mahogany water stain and two coats of the above varnish. The bedroom, bathroom doors and sun verandas received three applications of Pratt & Lambert's undercoating and four coats of the company's "Vitralite."

The bathroom has tile floor and walls, the latter to the height of the window and door tops, and is skirted by a narrow green border. It is provided with modern fixtures, consisting of a lavatory, closet, bathroom and shower equipment. The lavatory has a mixing faucet, and such accessories as soap and glass holders are provided. A wood medicine cabinet with a white enameled finish is also a part o fthe bathroom equipment. The closet has a low-down porcelain tank, while the seat and cover are also finished in white. The plumbing equipment takes care of all wastes from the ice boxes on both floors. In the basement is a 3-part laundry tray. Hot water throughout the building is supplied by a No. 5 coal heater manufactured by the Illinois Malleable Iron Co., Chicago, Ill.

The building is heated by a two-pipe system of hot water through the medium of a No. 2 "Kewanee" boiler, made by The Kewanee Boiler Co., Kewanee, Ill. The total radiation distributed is approximately 1200 sq. ft. The building is piped for gas and wired for electric lighting.

The two-family house here illustrated and described was built in Chicago at a cost not exceeding $10,000 from plans prepared by Architect George F. Lovdall, 953 Belmont Avenue, Chicago, for William J. Strohm, 7616 Rogers Avenue, Chicago, Ill. All work was let to separate contractors direct, the process of construction being supervised personally by Mr. Strohm.



A Western Type of Two-Family House—Elevation of the Sideboard in the Dining Room, Showing the Leaded Glass Windows Directly Over It—Scale 3/8 in. to the Foot

An exhibition of the work of the pupils of the Baron de Hirsch Trade School was held on Tuesday evening, Jan. 25, at the institution, 222 East Sixty-fourth Street, New York City.

New Building Construction in Manhattan and Brooklyn in 1915

While building operations in the borough of Manhattan, New York, showed an appreciable gain over 1914, they were not up to the figures of any one of the seven years prior to 1914. According to the filings with the Bureau of Buildings, permits were taken out last year for 489 new structures, estimated to cost $64,652,869, as against 411 new buildings costing $45,471,165 in the year previous.

According to classification, there were plans filed for 25 dwelling houses, to cost $792,500; also 193 tenement houses, to cost $24,980,500; 9 hotels to cost $2,030,000; 61 store and loft buildings, to cost $15,979,000; 24 office buildings, to cost $5,535,000; 20 manufactories and workshops, to cost $1,957,500; 5 school houses, to cost $1,045,000; 10 churches, to cost $872,000; 6 municipal buildings, to cost $10,454,000; 23 places of amusement, to cost $1,531,250; 6 hospitals, to cost $595,000; 63 stables and garages, to cost $872,705, and 44 other structures, to cost $57,414.

Plans were filed during the year for alterations to 3237 old buildings, estimated to cost $9,019,805.

During 1915, permits were granted in Brooklyn for 5121 buildings to cost $40,300,600, as compared with 2375 permits for 4379 buildings to cost $38,269,185 in 1914. Of the 5121 new buildings, for which plans were filed 3794 costing $33,413,720 were completed. This compares with 3483 buildings, costing $31,460,770, completed in 1914, an increase of 311 buildings and $1,952,950.

Permits were filed also for alterations to 9394 buildings to cost $5,301,251 in 1915, against alterations to 7066 buildings costing $3,603,122 in 1914. The combined operations during 1915 aggregated $45,601,851, an increase of $3,729,544.

Approximately $14,000,000 went into more than 600 apartment houses, while $10,000,000 was spent for nearly 2300 dwellings. Most of the new construction was along the subway routes.

Concrete Floors in Dwelling Houses*

The Experience of a Man Living in a House Having Floors of Concrete—Their Treatment

WHEN I was about to erect my home and decide on the subject of floors, my father, who had been a strong advocate of concrete floors in office buildings, advised me against their use in a residence. Careful inquiry developed the fact that he was not opposed to the floors but was satisfied that my friends and others would interpose all the objections to their use in a residence that we had formerly gone through in our office building, and so I decided to put wooden floors downstairs for the benefit of my friends and concrete floors upstairs for the use of my family; but finally we worked up one excuse after another for leaving the wood floors out of certain downstairs rooms and finally they were left out altogether.

Treatment of the Floors

My floors are of a warm brown tone and come up on the side walls about 6 inches and flush with the plaster to form what would otherwise be a baseboard. Downstairs they are decorated with a palette-knife and look somewhat like carved leather. After the "carving" had been done an artist worked various colors of the rainbow into the decoration and then they were all varnished and waxed so that keeping them in order is similar to the polishing of wood floors but the polishing is required much less frequently.

Upstairs we use velvet carpets of double width and plain colors, sewed together to form a mat or rug, but without a border, and extending within 6 in. or 8 in. of the side walls all the way around. We find that no nailing strips or other means of fastening are necessary, since the carpet lies perfectly flat and is sufficiently large so that it will not move about.

Downstairs we use Oriental rugs entirely and a curious feature in this respect is that moths will not hatch on the under side of a rug in contact with concrete, where they do hatch when it is in contact with wood. This applies to the under side of the rug only, because it is not impossible for them to hatch within the rug fabric itself.

The Use of Carpets or Rugs

Now, the common impression is that a concrete floor will make the room cold, but this impression is reached by people who have gone into rooms with concrete floors where there was no carpet on the floor and because at the moment, they were critical of concrete, but if one will go into a bare room where hard wood floors have been used they will get exactly the same effect. The addition of carpets and tapestries decreases the number of square feet where the air of the rooms comes in contact directly with the floor or side walls.

There is also an impression that concrete floors are damp. They are damp for the first two months after being laid and on this account should not be varnished or waxed, but after this period they are as dry as wooden floors. I have made accurate tests with hygrometers, to determine this point.

The concrete floor is to me most satisfactory because it is free from cracks in which dust accumulates and ascend every time the floor is flexed by stepping on it. There is never a squeak or other noise produced by the rubbing of one board of the interior floor on another. With carpets on the floors they are absolutely noiseless, and one cannot detect a person walking on an upper floor when he is in the room below, provided, of course, that there is a carpet on the floor above.

The concrete floor makes a much handsomer setting and background for Oriental rugs than wooden floors and one can do away with the unsightly baseboard, which always collects dust. Then there is none of the trouble of warping which comes with the use of wooden floors.

Above all else the house is fireproof when properly built in other respects and one can leave home with the assurance that neither property of any considerable value nor lives will be destroyed in the event of fire. I feel that my pictures, rugs and porcelains are as safe in my house as in a vault at the bank, barring the possibility of theft, which is rather remote.

*Extracts from a letter of Homer Laughlin, Jr., in *Concrete-Cement Age.*

Why Windows in Incompleted Buildings Are Whitened

The reason window panes are whitened in buildings not yet completed is thus explained by a local building contractor:

"We don't plaster them all over with chalk to prevent the public from seeing the unfinished condition of the interior, but to keep the workmen from battering out the glass. Transparent glass looks just about as transparent as air to the man who is moving a wooden or an iron beam in a hurry, and he is likely to ram the end of it through an expensive window, but when the glass is coated with white it becomes visible, and the workmen hand their material in through the door."

The "Home of Redwood" to Be Moved

The Redwood Bungalow at the Panama-Pacific Exposition, built to illustrate the use of redwood in building, several pictures of which were presented in the August issue of THE BUILDING AGE, and said to have cost $20,000, has been sold for $7,500 to George North, who plans to load it on two barges and move it to Santa Venetia, on the Marin county shore. The weight is estimated at 50 tons.

Chicago's 1915 Building Operations

Apartment Houses an Important Factor in an Approximate Increase of 16 Per Cent Over 1914

THE figures compiled by the building department of Chicago indicate that the industry in 1915 enjoyed a prosperity second only to the year 1911, which holds the record for the past decade. The year's showing is particularly impressive in view of the fact that for the first half there was a decrease of 533 in the number of permits issued and $5,146,400 in the estimated cost as compared with the first half of 1914.

Permits were issued in 1915 for the construction of 10,340 buildings, having a frontage of 318,011 ft. and estimated to cost $97,301,480, as against 9945 buildings consuming 289,271 ft. and involving an expenditure of $83,261,710 in 1914.

This data reveals an increase of 395 buildings and 28,740 ft. frontage and a greater cost of $14,040,000. In other words, the gain is approximately 16 per cent.

The best months in 1915 were October, November and December, with October slightly in the lead.

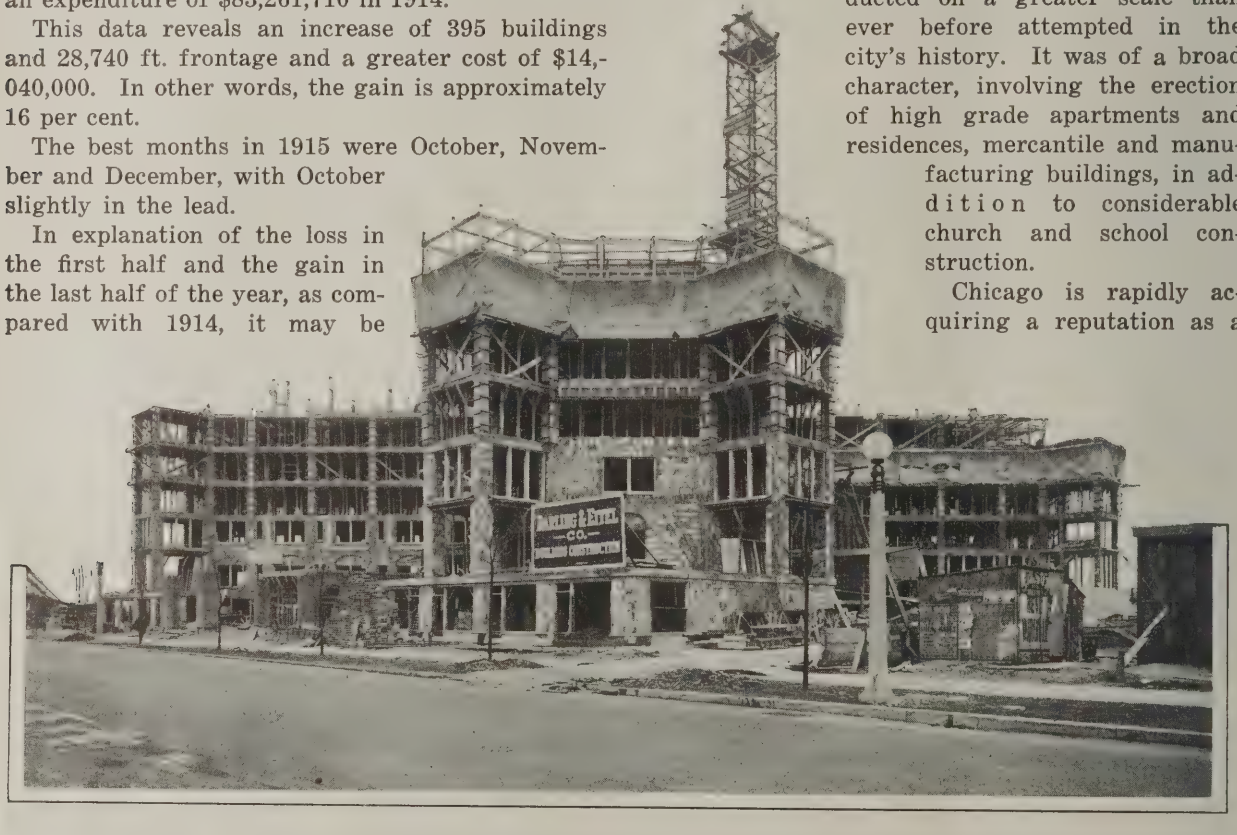
In explanation of the loss in the first half and the gain in the last half of the year, as compared with 1914, it may be stated that the comparison for the earlier months is with the period just preceding the European war. At that time there was great activity in building as the result of the rapidly growing ease in the money market. Building operations in the first half of 1915 were also hampered by trouble in the building trades.

Contractors are now looking forward with some degree of confidence to a good business in 1916.

The gain in 1915 did not commence until the month of August, and from that time until the end of the year there was a very gratifying increase. This, too, may be traced to the fact that during the last half of 1914 the building industry, like many other lines of business, suffered a partial paralysis as the result of the chaotic financial and general business conditions which followed the outbreak of the war. However, eliminating the comparison with 1914, it will be seen from the table below giving the figures for the past ten years that Chicago really enjoyed a year of prosperity.

It was a year of real expansion. This statement means that the greatest activity was noticeable in the outlying sections of the city, and there was comparatively little construction in the downtown district. In fact, the work was conducted on a greater scale than ever before attempted in the city's history. It was of a broad character, involving the erection of high grade apartments and residences, mercantile and manufacturing buildings, in addition to considerable church and school construction.

Chicago is rapidly acquiring a reputation as a city of flats, and the activities during the past year are substantial evidence that the statement is one of actual fact. Apartment house construction all over the city has been on a particularly large scale, and while the actual volume cannot be stated with accuracy it has been said that, including store and theater buildings containing flats, this figure may be estimated at nearly 40 per cent of the total expenditure. Brick has been used in enormous quantities, and most modern apartments are not complete without sun parlors. A large number of the court type have been completed, while apartments designed to accommodate anywhere from two to



One of Chicago's Important Building Improvements in 1915—*The Edgewater Beach Hotel Here Shown in Process of Erection*



Top Row, Left to Right—The 20th Century Building, the Y. M. C. A. Building and the Cunard Building
Bottom Row—Lyon & Healy's Building and the Boston Store

Chicago's Building Operations in 1915*—Some of the More Important Structures Erected*

twelve families are very much in demand. The arrangements usually embody such fixtures as buffets and china closets, bookcases, etc., which means that the carpenter is getting his share of the prosperity.

It is said that there was a much greater percentage of high class buildings erected last year than during 1914. The public taste has been undergoing a rapid education in this respect during the last few years, a fact which progressive builders have come to recognize.

The table here given shows comparisons for the past 10 years.

Years	Number of Buildings	Number Feet Frontage	Cost
1906	10,447	276,770	$64,298,335
1907	9,338	253,993	59,065,080
1908	10,771	291,655	68,204,080
1909	11,241	310,351	90,509,580
1910	11,409	327,250	96,932,700
1911	11,106	299,032	105,269,700
1912	11,210	322,454	88,048,500
1913	10,901	322,002	89,495,000
1914	9,945	289,271	83,261,710
1915	10,340	318,011	97,301,480

General building construction has been on a large scale in the Kenwood and Hyde Park districts on the south side, as well as in the new so-called South Shore section. On the north side Lake View and Rogers Park have seen many improvements, while the same may be said of Ravenswood and other parts of the growing northwest. The outlying western sections have also seen a building boom, and the suburb of Oak Park has witnessed an unprecedented amount of flat building.

Building in the "loop" was conducted on a comparatively limited scale as compared with former years, although permits were taken out for the construction of several fine structures, some of which have been completed.

The most important of these was the Kimball Building, which cost in the neighborhood of $1,250,000. The new Lyon & Healy Building involved an expenditure of $650,000, the 20th Century Building $500,000, and the Y. M. C. A. Hotel, about a mile south of downtown, $750,000. Other modern structures erected in the "loop" are the addition to the Boston Store, to make room for which the Champlain Building was demolished, and the Cunard Building, on which $200,000 was spent. Some of these buildings are pictured on the previous page.

The largest permit of the year was for the Chicago and Northwestern elevator in South Chicago, costing $3,500,000.

The Edgewater Beach Hotel, now in course of construction, will be one of the largest of its kind outside of the business district. It is being erected by the Darling & Eitel Co., Chicago, on a plot of ground on Sheridan Road, facing Lake Michigan, about seven miles from downtown in a northerly direction. A view of it will be found on the first page of this article.

In the construction of the South Shore Country Club, the Armour & Co. oleo building, the Midland Warehouse & Transportation Co. Building, and several more, a dozen in all, the sum of approximately $3,000,000 was involved. In addition to this sixty-two permits were taken out for apartments, mercantile, manufacturing and school buildings, ranging from $100,000 to $200,000.

Low Cost Concrete Houses in Scotland

A housing scheme has been carried out at Renfrew, in Scotland, which is particularly interesting from the fact that the houses have been built of concrete. The architect is an enthusiastic believer in concrete for houses, holding that it is the solution of the cheap housing problem, though he thinks the best method of building with it has yet to be devised. He estimates that he effects a saving of £12 ($60) on a pair of cottages, and where large numbers are built together the saving is still greater.

The Renfrew houses, according to a London paper, are conveniently planned, and of attractive appearance. The walls are 9 in. thick, including a 2 in. air space. The longitudinal partitions are formed of coke breeze concrete slabs, and the cross partitions are brick. The external walls are rough casted with Portland cement and granite chips.

Officers of American Institute of Architects

At the forty-ninth annual convention of the American Institute of Architects, held in the city of Washington in December, the following officers were chosen for the ensuing year:

President—John L. Mauran of St. Louis.

First Vice-Pres.—C. Grant La Farg of New York City.

Second Vice-Pres.—M. B. Medary, Jr., of Philadelphia.

Secy.—Burt L. Fernner of New York City.

Treas.—D. E. Waid of New York City.

One of the most interesting reports presented was that of the Committee on Contracts and Specifications, which recorded the completion of the new Standard Documents of the Institute and which represent the results of the joint committee of the American Institute of Architects and of the National Association of Builders' Exchanges. In connection with this matter great credit is due to the tact and perseverance of Frank Miles Day, a former president of the institute, and to the committee of which he was the head.

Lumber Exploitation Plans

Realizing the important work accomplished by organizations for the promotion of other materials, the leading lumbermen of San Francisco, representing both California redwood and pine and northern Douglas fir and cedar, have organized the San Francisco Wood Products Association to promote the use of wood in every way possible, to counteract disparaging statements circulated regarding lumber, to maintain a permanent wood-products exhibit in San Francisco and to advertise lumber throughout California as far as possible by lectures, moving pictures and portable exhibits, and to furnish information to the public regarding all Pacific coast wood products. The first work planned is the installation of an elaborate exhibit in the building material exhibit at O'Farrell and Stockton streets.

The West Coast Lumber Manufacturers' Association also is assembling large exhibits of woods of this section to be shown at the various retail lumbermen's conventions during the year

The Economy of the Concrete Mixer

Advantages Which the Builder Doing Concrete Work Cannot Afford to Disregard—Machine vs. Hand Mixing

By H. Colin Campbell



IF machine mixing of concrete had accomplished no other end than the elimination of the manual labor of hand mixing, concrete mixers would hold their own without necessity of proving they have other advantages. These have been numerous enough to have almost relegated hand mixing into the past, except where a certain combination of circumstances occasionally makes it advisable to manufacture concrete in that way. On all extensive concrete construction the material is now mixed by machine, yet under certain conditions hand mixing is necessary and may at times be more economical. To summarize, these may be stated as follows:

Where the quantity is so small as to prohibit the expense of purchasing or renting a mixer.

Where the quantity of concrete is distributed at different places in small quantities so that the labor and expense of moving the mixer frequently would offset the saving otherwise resulting from its use.

And sometimes at the commencement of a large job before all of the equipment has been set up and the work put under way at full speed.

Cost accounting has been kept on many concrete jobs, all of which shows that where the work is of any considerable expense the saving of machine mixing as compared with hand mixing may range anywhere from 25 to 55 cents per cubic yard of concrete. It requires but little figuring to show how soon such a saving can be made to absorb the cost of one of the small or medium-sized mixers at least, which are now the types popular with the average building contractor.



A Small Portable Concrete Mixer in Use in Connection with a Suburban Job

Machine mixing eliminates much of the guesswork that is sometimes too common in hand mixing. To secure full efficiency of a machine, the materials must be measured with more or less definiteness, therefore the concrete is proportioned more nearly as it should be. This, of course, has a marked influence on the uniformity of strength of the resulting concrete. In addition to this, numerous tests have proved that on account of more uniform proportioning, which in a measure is compelled by the machine mixer, and the thoroughness of mechanical intermixing of materials, the strength of machine-mixed concrete is from 15 to 25 per cent greater than that of the average hand-mixed concrete.



Some Concrete Boxes Designed for the Reception of Ashes and Garbage

In hand mixing, on account of the carelessness displayed in constructing mixing platforms, there is more or less loss of cement from leaky platforms as the result of the methods by which water is frequently added to the materials when mixing the mass. This loss of cement is rarely or never regained, hence the resulting concrete will be weakened by being robbed of cement which should have been made a part of the mixture; likewise, it is all too common practice for a small quantity of concrete to be mixed on a roughly smoothed area of the ground and considerable earth is then taken up with the materials, either while mixing or when shoveling into barrows for placing. Not only is there a loss of cement, and adulteration from foreign materials from such indifferent methods of mixing, but there is also a loss of water which is absorbed by the ground or which leaks from the mixing platform.

Choice between machine and hand mixing depends largely upon the nature of the work in which the contractor is engaged. On small relatively unimportant jobs, especially where the builder uses concrete only at wide intervals, it is not ordinarily much cheaper nor more efficient to mix concrete by

machine. Usually economies are in favor of hand mixing under such conditions. This is more specially true where only a small crew is engaged on the work, say from three to four men, and the concrete is placed in scattered positions where necessity would compel moving the mixer about from place to place. Only a few years ago there were many engineers and contractors who regarded me-



The Economy of the Concrete Mixer—A Small Pool Built of Concrete

chanical mixing of concrete as a dangerous proposition, one that was likely to result in a weakening rather than an increase in strength of the resulting concrete. Such an attitude can perhaps be partly understood when we realize that practically all innovations along similar lines have met with like objection on the part of those who could not foresee the result of any departure from common practice; that is, they regarded all innovations in the light of danger rather than benefit. To-day, however, the superiority of the mixer has been proved and it has become an indispensable adjunct to construction. Even in those cases mentioned where it seems that hand mixing shows greater economy, there is no question but that the resulting concrete is not so good as it might be, if mixed by machine. Mixer manufacturers have brought out machines in great variety. The small mixers, of admirable design and low price, fall within the range of any contractor's requirements and purse.

The small mixer is particularly adapted to concrete house and small building construction, sidewalk work, and being constructed, as it nowadays is—as a unit complete with gasoline engine for its operation—it can often be made to serve admirably where one would sometimes be inclined to think a larger class or type of machine would better serve the purpose.

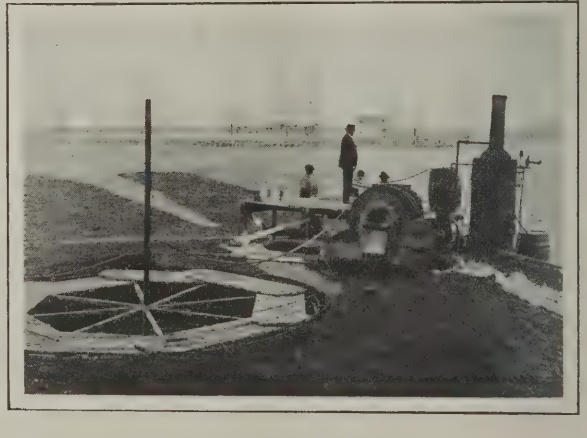
As to the best type of machine for any one to choose to meet his individual requirements, this cannot be answered in a word. Regardless of how small the builder's field of operation may be, he certainly wants a machine having a capacity that permits making no smaller than one-sack batches. This prevents the necessity of breaking sacks and measuring fractional parts of cubic foot of cement, since the 94-lb. cement sack is regarded as 1 cu. ft. in proportioning concrete mixtures by volume. Therefore, greater capacity, if desired, will be determined by the size of the gang to be served and the required speed of construction.

In mixing concrete in the proportions of 1:2:3, 6 cu. ft. of loose materials are required for a one-bag batch, while in a leaner mixture such at 1:3:5, 9 cu. ft. of loose materials are put into the mixture. This bulk, of course, becomes less when the materials begin to combine as the result of mixing, but the drum capacity should be such that when the desired quantity of materials has been placed in it preparatory to mixing, the drum will not be more than one-third full. This is quite essential to best results in mixing.

Many carpenter-contractors and builders have no doubt often refused to take the concrete portion of the job on which they were working, simply because of lacking means to machine-mix concrete. Profit on concrete work is just as good as profit on other building work and considering the fact that medium-sized mixers are now sold for such relatively low prices, only a few concrete jobs are necessary to cause profits on foundation, floor, and similar work to absorb the cost of an outfit.

Concrete mixers have been and often can be profitably made to serve the purpose for which not primarily intended. Many have found the machine mixer of advantage in washing aggregates that were unfit for use because of clay coating or foreign materials and have dumped the aggregates into the drum, added water in excess and operated the machine in the usual way, thus making available otherwise unsuitable aggregates. Some mixers have been advantageously employed for mixing mortar as well as concrete.

With the exceptions mentioned, every feature of the machine mixer is in its favor as compared with the slow and laborious process of hand mixing. Even farmers who have little concrete work to do by comparison with the actively engaged building contractor have in many instances found it not only advantageous but profitable to purchase some one of the small types of hand or machine-operated mixer, so that they might mix better concrete, with



A Job of Concrete Work on the Farm. The Wire Reinforcement in Place

less labor and greater economy. Also, dealers in building materials have recognized the popular rural demands for concrete mixers and many such dealers have bought one or several mixers for rental purposes exclusively, and in some cases have found these a direct double source of revenue, in that they attract cement purchasers to their place because the necessary equipment for mixing concrete can also be obtained on reasonable terms.



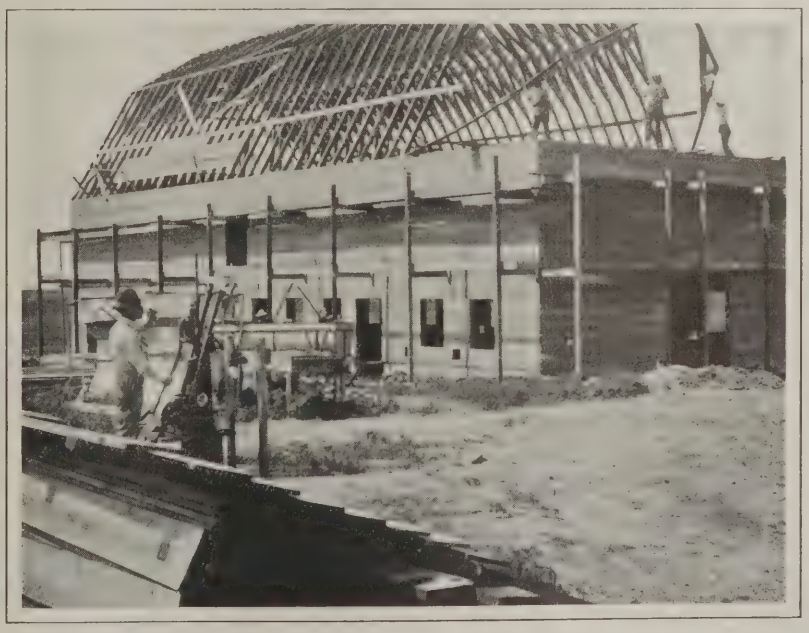
The Modern Plank Frame Farm Barn

The Foundation Walls, Which Are of Concrete, Extend 2 Ft. Above the Grade Line

By W. E. Frudden

ONE of the systems of barn framing which is proving very popular in many of the agricultural districts of the country is that involving the use of planks instead of large timbers, and known as plank frame construction. It is easy to erect, offers a maximum of mow space and is economical in the use of building materials. There are hundreds of farmers who have found this type of framing best adapted to their needs.

The standard barn width, namely 36 ft. has been considered in this article, but the length of barn can be made to suit the particular needs of the farm. The foundation walls are of concrete 12 in. thick and extend 2 ft. above the grade line so that the soil moisture will not rot out the wood sills. The concrete walls can be tapered to 8 in. at the top, if desired, or in case hollow clay or cement blocks are available at a reasonable price, they may be used to advantage.

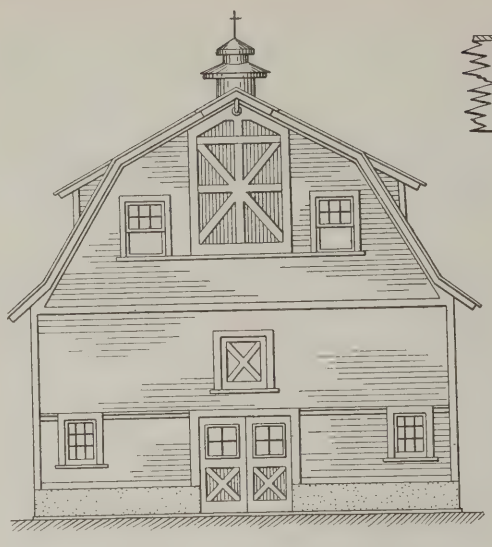


A 36 x 80-Ft. Barn Showing the Roof Bents Being Placed in Position

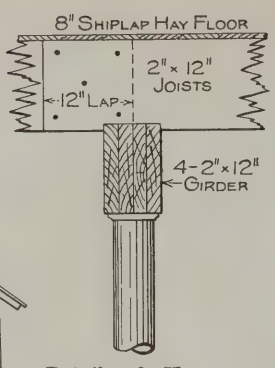
The studding sills, plates and rafters are of 2 x 6 in. material. The sills are doubled and anchored to the wall every 6 ft. The studding, rafters and floor joists are spaced 2 ft. center to center throughout the whole length of the barn. The floor joists are 2 x 12 in. and are supported by center girders which are built-up, being made from four 12-in. planks spiked together and supported by 5 in. steel columns or 6 x 6 in. posts spaced conveniently in the first floor. Each roof arch is braced down to the mow floor and bolted at the joint. The floor joists are lapped over the girders and well spiked together so as to be a continuous tie across the barn and thereby take up the outward thrust of it.

In what follows describes the different steps as they are taken up by the contractor in the building of this type of a farm barn:

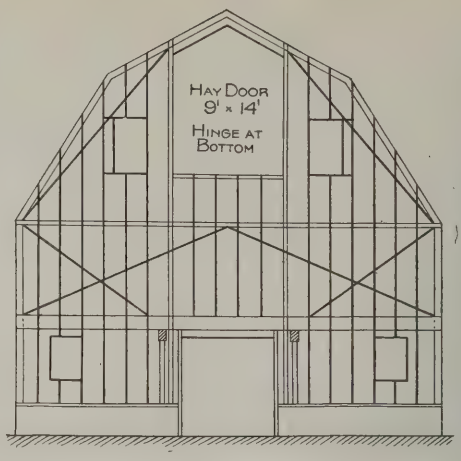
The side walls, which are framed out of 2 x 6 in. material, are commonly made from 16 ft. lumber, as shown in the cross sections. The framing is best if done before it is raised into position. The double 2 x 6 in. sill is spiked to the bottom of the studs and another double 2 x 6 to the top for the plate. The 6-in. rib plate which serves as a bearing for the hay mow joists are notched 1 in. into the inside face of the studding. Frame out for the windows, doors and vent shafts and then bore holes through the sill for the anchor bolts which have been set 6 ft. on centers in the solid masonry walls of the barn.



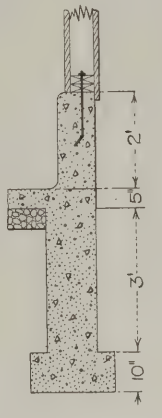
South End Elevation—Scale 1/16 In. to the Foot



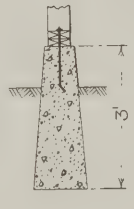
Detail of Hay Floor Construction — Scale ½ In. to the Foot



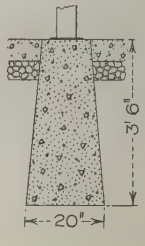
Detail of the End Framing—Scale 1/16 In. to the Foot



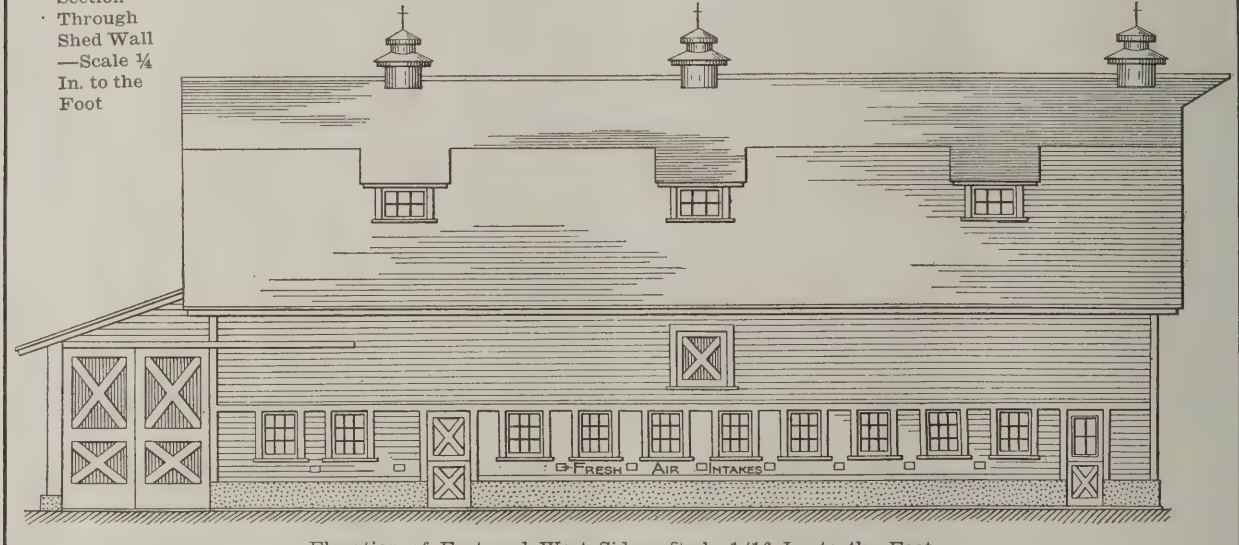
To the Right, Section Through the Main Wall — Scale ¼ In. to the Foot



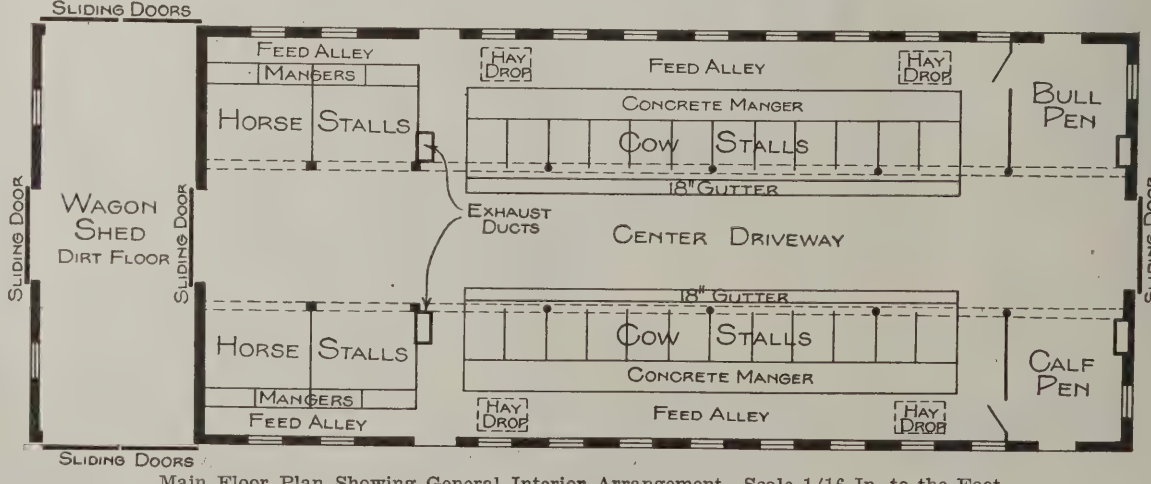
Section Through Shed Wall —Scale ¼ In. to the Foot



To the Right, Section of One of the Piers—Scale ¼ In. to the Foot



Elevation of East and West Sides—Scale 1/16 In. to the Foot



Main Floor Plan Showing General Interior Arrangement—Scale 1/16 In. to the Foot

The Modern Plank Frame Farm Barn—Plan, Elevation and Various Details of Construction

For long barns, the side walls are raised in several sections.

In the same manner as the side walls, the ends are framed and raised into position and set plumb and well braced against wind. A double 2 x 10-in. plate instead of 6-in. will be preferable for the end walls.

The two continuous girders are built up four-ply on top of the supporting columns which have been set in their proper places. In the building of the girders, the 12-in. planks are so placed that no two end butt joints will come at the same place in the completed girder. The girders are set straight and level and so that the floor joists will be dapped about 2 in.



The Plank Frame Barn Showing the Roof Bents or Arches in Place

The outward end of the joists are bolted to the studding. The center span of the joists are of 14 ft. lumber and the sides of 12 ft. lumber, and since the girders are 12 ft. apart there will be a 1-ft. lap of joists over each girder, which are well spiked with 16d. spikes, which will just go through the two timbers. There may be cases where all 12-ft. joists are to be used where they will butt together over the girders, in which case it will be necessary that this joint be well tied together with a 1 x 8-in. cleat on both sides of the joists.

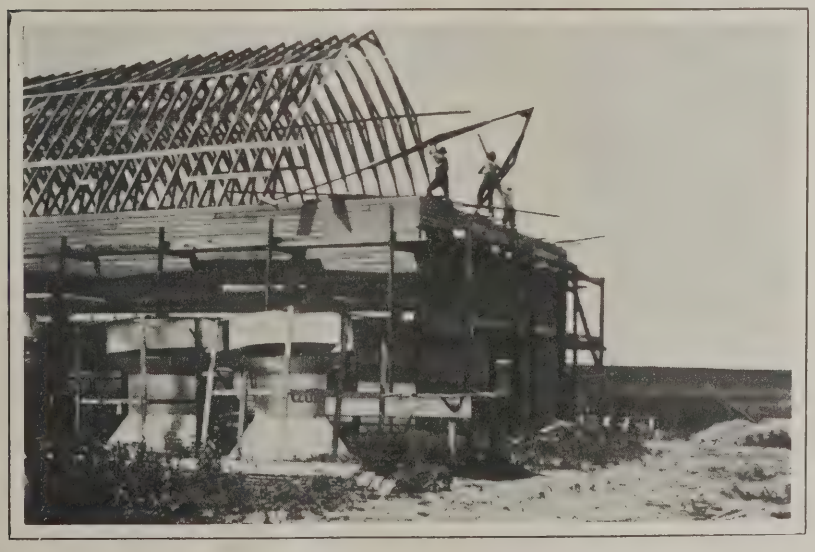
Bridging the joists means that the loads will be evenly distributed over the floor. One by four-inch material is used for this work and nailed into position as soon as the joists are set true and plumb.



Inside View of the Framework Showing the Temporary Working Platform

The gable end framing is clearly shown in the details. The ends are braced securely with strong plank, and diagonal braces which are not shown run from the side plate to the end wall plate as an added stiffener for the end of the barn. The studding on both sides of the hay door are doubled and in many cases are braced down to the floor.

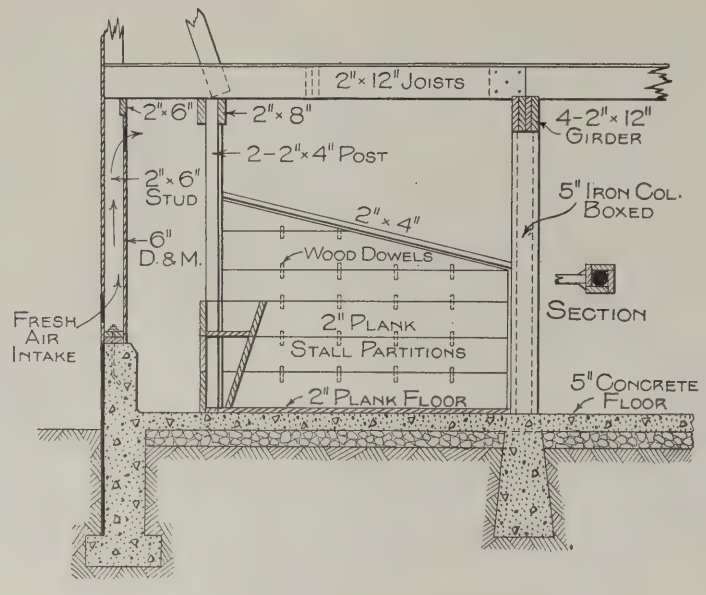
Now that all the side and end walls have been erected and the floor joists set, they may be covered with the regular siding and flooring lumber that is to be used. This will tend to stiffen that part of the frame that is already up. The siding best used is the common 6-in. or 8-in. pine drop siding which is double nailed to each studding. The floor joists are covered usually with a 10-in. wide yellow pine shiplap lumber.



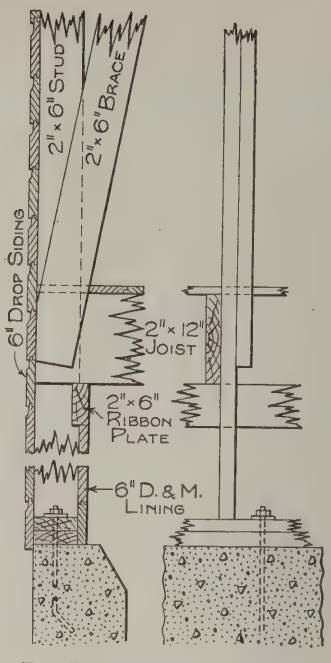
The Last 8 or 9 Roof Arches Raised and Set in Close Together for Convenience. After All Are Hoisted They Are Moved Toward the Gable End One at a Time and Set 2 Ft. on Centers

The mow floor is a good level place for the building of the roof trusses. For a barn of this type, there is required for each roof arch, four rafters, two of which are 12 ft. long and the others 16 ft., the four 8-in. boards for braces 12 ft. long, as there will be two at each hip joint. At the ridge there is required a short piece of 2 x 6-in. material for a collar beam and short pieces of boards for cleats and an 8-in. plank for a strut, so as to make a tight and solid joint.

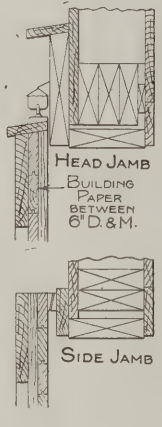
All arches are built up on the mow floor before being hoisted into position. This insures the builder that they will all be alike and of exactly the same contour. The use of crooked rafters will



Cross-Section Through Horse Stall—Scale 3/16 In. to the Foot



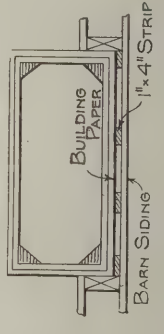
Details of Ground Floor Framing—Scale ½ In. to the Foot



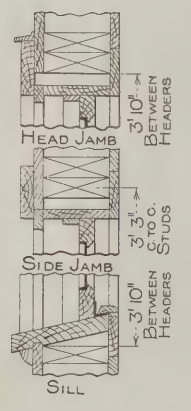
To the right Details of Door Frame —Scale ¾ In. to the Foot



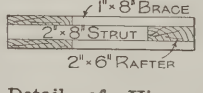
Section Through Intake



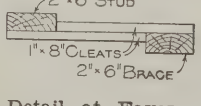
Section of Exhaust



Details of Window Frame — Scale ¾ In. to the Foot



Detail of Hip — Scale ⅛ In. to the Foot



Detail at Eaves—Scale ⅛ In. to the Foot

Typical Cross-Section of Barn—Scale ⅛ In. to the Foot

Miscellaneous Constructive Details of a Modern Plank Frame Farm Barn



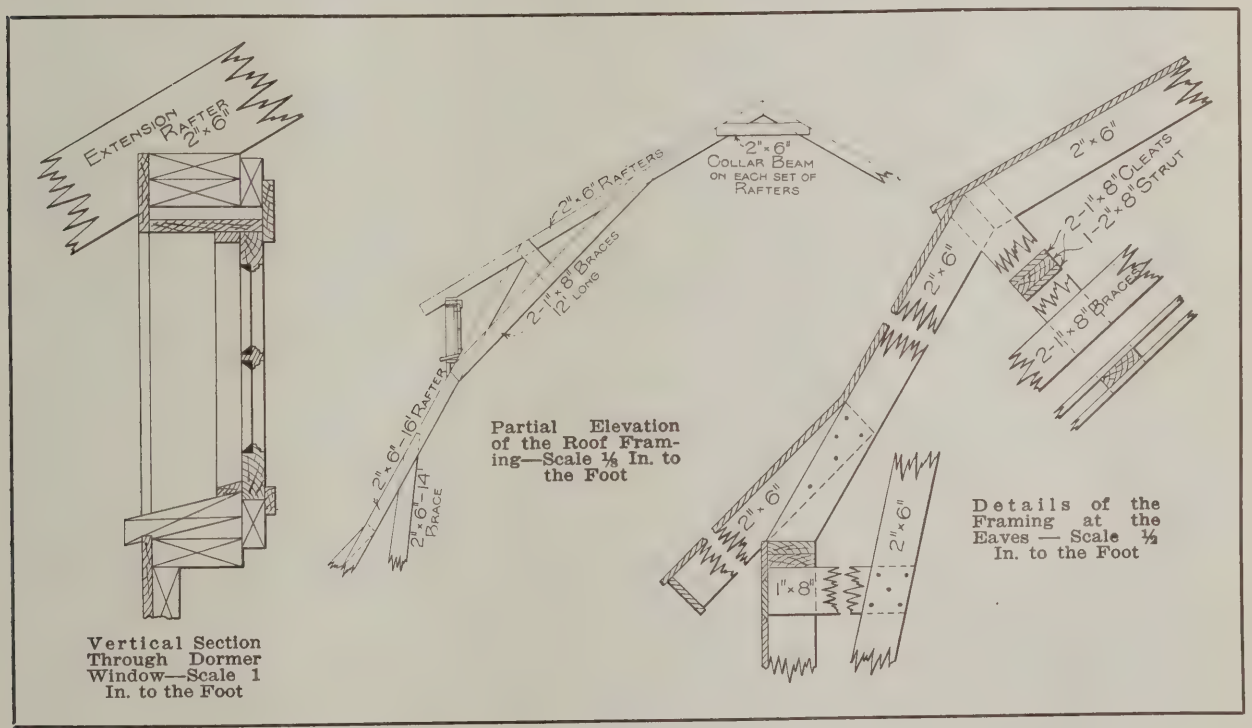
SHOWING RELATIVE POSITION OF THE VARIOUS FARM BUILDINGS, MORE PARTICULARLY THE BARN AND THE HOUSE

prove to be a very uneven roof. When the arches are hoisted by means of a block and tackle from the end arch they are set directly over the studding or on 2-ft. centers with the lower rafters resting on the side wall plate, and securely nailed to it. Allow the sheathing boards to project from the gable so as to hold the arch in position as fast as they are being raised. Break the sheathing joints so as to make a continuous tie for the entire length of the barn.

From the center of the lower rafters 2 x 6-in braces run to the inter-section of the studding and the floor joists, and are held firmly in place there by a ½-in bolt. At the plate 1 x 8-in. cleats, doubled, run out to the brace to act as a stiffener.

inches is the greatest thickness, 12 in. is the greatest width and 6 ft. is the longest timber required in the entire barn frame. No special sizes or extra long, heavy timbers are to go into the frame. All can be secured of any lumber dealer's stock in section of the Corn Belt. The kinds of covering which is common have been listed in the bill of materials which follow:

As a basis for estimate, a 14-ft. section of the 36-ft. wide barn has been taken. To compute the amounts of materials required and a general idea as to the cost of them multiply the amounts listed below by the number of times that 14 is contained in the length of barn wanted. For example: Take



A Modern Plank Frame Farm Barn—Various Details of Construction

This completes the arch from floor to floor. In case all joints have been made to fit properly in this barn frame, the roof arch or the side walls will not spread or be forced out of position. Good workmanship, good materials and good judgment used in the building will give as a result a barn that will be serviceable and one that will last the farmers for years. In case wider barns are necessary, this design will not hold good, but sizes of timbers and braces must be increased accordingly.

A factor which strongly recommends this barn design is that small timbers alone are needed. Two

a 70-ft. barn—requires five times the materials for a 14-ft. section; then add to this amount that which will be required for the two ends of the barn as has been listed below. The total cost of the barn can be roughly estimated by adding to the costs of materials as listed about 50 per cent to cover barn equipment, labor, windows, doors, hardware and paint. An estimate of several of this type of barns has developed the fact that they will cost in the neighborhood of about $1 per square foot of the floor; such barns, however, are elaborately equipped. The matter of prices, of course, cannot

be treated satisfactorily, so that it will meet all farmers' conditions.

Materials Required for a 14-Ft. Section

112 cu. ft. concrete walls at .25			$28.00	
504 sq. ft. concrete floor at .10			50.40	$78.40
56 ft. 2 x 6		sills		
56		plates		
28		rib plates		
256	16′	studding		
256	16	braces		
256	16	rafters		
192	12	rafters		
48	6	collar beams		
43 ft. 2 x 4	4′	lookouts		
256 ft. 1 x 8	12′	braces		
116 ft. 1 x 8		cleats		
32 ft. 2 x 8		struts		
384 ft. 2x12	12	joists		
224	14	joists		
224 ft. 2x12		girders		
2427 ft. dimension lumber at $26.00			$63.10	
540 ft. drop siding lumber at 45.00			24.30	
650 ft. roof sheathing at 23.00			14.95	
7 M cedar shingles at 3.75			26.25	
600 ft. shiplap flooring at 30.00			18.00	146.60
MATERIAL FOR 14 ft. section				$225.00

Materials Required for the Two Ends of the Barns

290 cu. ft. concrete walls at $0.25				$72.50
144 ft. 2 x 6		sills		
240 ft. 2 x 10		plates		
1250 ft. 2 x 6	16′	studding		
160 ft. 2 x 8		braces		
1794 ft. dimension lumber at $26.00				46.64
2560 ft. drop siding at $45.00				115.20
MATERIAL FOR THE TWO ENDS				$234.34

The illustrations relate to the farm barn of E. M. Sherman in Emmet County, Iowa, and the drawings were prepared by the author.

The Quantity System of Estimating

We are in receipt of the following announcement from G. Alexander Wright of San Francisco, Cal., who was the pioneer in this country in the movement in aid of the quantity system and better contract methods:

"The movement urging the adoption of the quantity system in the United States was commenced in San Francisco early in 1891. This movement has continued down to the present time. Its object has never been, and is not, to profit financially, but to promote better contracting methods between owner and contractor, solely because they *are* better. Neither the movement nor its promoter indorses any firm or individual, as is commonly supposed, or suggested.

"Considerable interest has been aroused in the United States as a direct result of these long continued efforts. Much of an educational value has been accomplished. Those, however, who have the future adoption of the quantity system really at heart (and not because of the business it may bring them) realize that much more preliminary and gratuitous work must be done before the advantages of the quantity system can be fully understood and appreciated by contractors and owners.

"Unfortunately, however, as is so often the case (when likely-looking prospects appear upon the business horizon), the commercial spirit, the dollar desire which cannot wait, has been aroused, and we already have business enterprises advertising their wares, their material lists, or what not, from a few dollars up. Then, again, during the last year or two there have sprung up, principally in our larger Eastern cities, certain self-styled exponents of the quantity system, some of whom, it is safe to say, have no practical experience of the quantity system, and herein lies a danger before us.

"It therefore behooves the conservative admirers or advocates of the quantity system to mark time and not be too ready, at least for the present, to allow the use of their names as advocates of the immature, faulty and varying methods adopted by firms, bureaus or individuals who, to get business, are far too ready to make claims for their so-called lists, quantity surveys, unit items or whatever name the promoters invent to attract customers. It is sufficient to say that such methods are not those of persons educated in the practical operation of the quantity system, and which is the only standard method which possesses any advantage over the contracting practices of to-day. The 'quantity system' is the proper term to use, and it possesses a greater signficance than anything else."

Note—No bill of quantities should be regarded as acceptable which contains any clause making it the duty of a bidder to refer back to the drawings and specifications concerning quantity. All such clauses are against the bidder, and they impose a responsibility upon him which he should not accept, and which may be construed as constituting a condition precedent to his bidding.

San Francisco Masons and Builders Meet

At a meeting on Jan. 3, the Masons' and Builders' Association of San Francisco elected officers for the ensuing year as follows: Emil Hogberg, president; E. S. Rainey, first vice-president; Alonzo Reed, second vice-president; William S. Scott, secretary, and J. E. Brennan, treasurer.

The following directors were also elected: Thomas J. Campbell, W. A. Rainey, A. W. Lawson, J. J. Butler and N. Larsen.

The arbitration committee includes Jerome Collins, Thomas F. Mulcahy and William S. Scott.

Giant Trees of Sequoia

In one of the National parks of the country there are more than a million monstrous Sequoia trees, one of which is known to have sprouted 3200 years ago and has lived through written history. It is said that 3000 fence posts, sufficient to support a wire fence around 8000 or 9000 acres, have been made from one of these giants, and that was only the first step toward using its huge carcass. The second item of its product was 65,000 shingles —enough to cover the roofs of seventy or eighty houses. Finally, there still remained hundreds of cords of firewood which no one could use, because of the expense of hauling it out of the mountains.

These trees are found in the Sequoia National Park, which was created for the use and pleasure of the people of the United States, and constitutes the greatest groves of the oldest, the biggest and the most remarkable trees in the world. They number 1,166,000, and of these 12,000 are more than 10 ft. in diameter. The highest known is the Dalton, which is 292 ft. in height and 27 ft. in diameter. Most celebrated of all, however, is the General Sherman tree, 279.9 ft. in height and having a diameter of 36½ ft. The base circumference is 102.8 ft. and the circumference 6 ft. above the ground is 86 ft., while the diameter 100 ft. above the ground is 17.7 ft.

The Molded Concrete House of Today

Some Carefully Prepared Figures of Cost with a Brief Description of a Small Concrete House

By Milton Dana Morrill

THE progressive builder realizes to-day the increasing demand for more permanent houses and he is constantly on the lookout to improve his materials and methods of construction. Heretofore the higher cost of permanent houses has been the most serious obstacle encountered, and it will perhaps be of interest to readers of The Building Age to give a short description and carefully made cost data of a small house of molded concrete lately built near Washington, D. C., showing the possibilities offered the builder by the use of this type of construction.



General Appearance of a Small Concrete House Recently Erected Near Washington, D. C.

It is useless to claim that this or any other type of permanent building can be put up for less than the cheap frame house, but where "the best and cheapest in the end" is sought, there molded concrete comes in for consideration, and at a cost which is in no way prohibitive wherever average building conditions prevail.

We have all watched the adoption of concrete grow in its many present uses. Only a few years ago it began to take the place of flagstones for sidewalks and to-day it has largely supplanted other materials for this purpose. It then came into use for foundations and basement walls, and is fast supplanting other materials in this work. In the last few years concrete has been used more and more for wall construction and is "making good," with the prospect of a much more general use in the near future, as builders and the public learn to know it better.

Concrete must be "mixed with brains," and there is nothing more misleading than the general impression prevalent that care and skill are not necessary in concrete work. On the other hand, while molded concrete is one of the easiest building materials to use it must be "done right the first time" if a workmanlike job is to result. The very permanent character of this work which is perhaps its greatest advantage makes it difficult, if not impossible, to undo what has been once completed. Mistakes, therefore, are expensive.

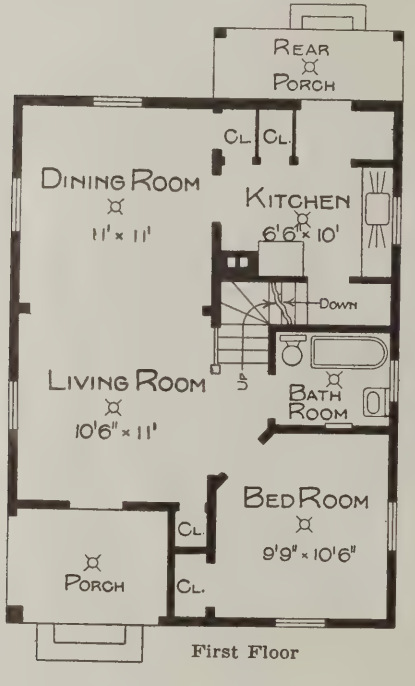
The house here illustrated represents one of the latest designs for the molded type and is the first

of a group of six to be built from the same floor plan, but with roofs of different shapes, in order to get away from the monotonous effect produced by rows of houses of the same design.

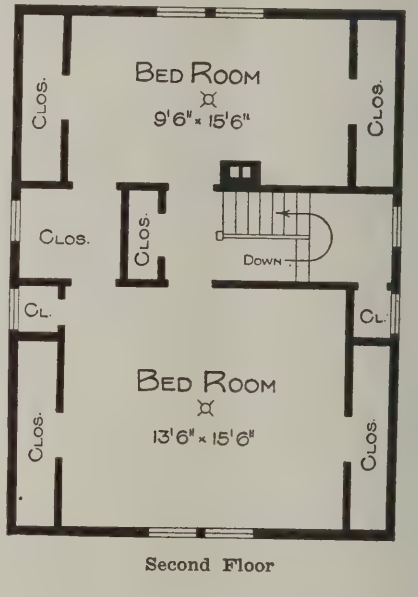
The cottage is compact in arrangement, and is planned to give a generous house, although of small dimensions.

A cellar extends under the whole house, the earth excavated being used to make a grass terrace on all sides. A hot air furnace is installed in the cellar and the bath and kitchen sink are connected for hot and cold water.

In the first story is a small porch arranged to be screened in during the summer and inclosed in glass in winter. This opens directly into the living room, where the alcove hall, screened by a curtain, affords entrance to the bath and bedrooms without taking any excess of space. The dining and living rooms are practically one, so that a generous appearance is given to both. On the second floor are two good-sized bedrooms with ample closets and store rooms.



First Floor



Second Floor

The Molded Concrete House of To-day—Floor Plans—Scale 1/16 In. to the Foot

The walls are of reinforced concrete, 4 in. thick, in which are embedded small wood blocks to receive the wood furring strips so that an air space is created between the concrete and the plaster or wall board that may be used. This construction makes an exceptionally warm, dry house.

The walls were molded in steel forms so that a wet mixture could be used giving an excellent bond with the reinforcing rods which were run both horizontally and vertically, as is necessary in thin walls. The steel forms leave a smooth surface, which is covered with a thin coat of cement stucco. This may be left rough or smooth, and tinted as desired, giving an excellent finish at small expense.

The construction of molded concrete houses is a simple process as is shown by the picture taken while the molds were being filled, and the only equipment necessary are the steel molds, which, being practically indestructible, can be used over and over again for several years, and are counted in by the builder as permanent equipment.

Some Figures of Cost

The following figures of cost of various parts of the work are likely to prove of general interest.

Material;		
Lime, cement and reinforcing rods delivered	$62.35	
Cinders	5.00	
Hardware	32.14	
Sand delivered	17.50	
Terra cotta flue lining	5.35	
Vulcanite roofing and siding	75.86	
Two white-wash brushes at 50c	1.00	
Lumber, etc	448.48	
Two ventilators for gables at 50c	1.00	
Mirror for bath room	2.25	
Beaver board	96.83	$746.76
Drayage;		
Drayage of cinders	$9.00	
Drayage of plates	1.00	
Drayage of returning cement sacks	0.50	10.50
Common labor;		
Excavating, including team	$10.00	
Labor erecting walls, etc	111.00	
Labor grading and sodding lawn and finishing cellar	15.87	
Labor digging sewerage cistern and applying cover	34.00	170.87
Contracts;		
Supervision of concrete work	$25.00	
Carpenter work on house	300.00	
Carpenter work on porch	15.00	340.00
Sub-contracts, including labor and material;		
Plumbing	$184.75	
Heating plant	73.00	
Painting	100.00	
Lighting	26.00	383.75
Skilled labor not specified in contracts;		
Placing ventilators in gables	$5.00	5.00
Total		$1657.88
Less credit for returning 100 cement sacks		10.00
Total		$1647.88
Extra work not included in contracts		30.00
Total		$1677.88

The substantial character and the attractive appearance of the molded concrete houses make a striking contrast with the usual frame dwellings and the saving in paint and up-keep is a factor which the home owner cannot profitably disregard.

Construction of the Garage

Perhaps no industrial development has eclipsed the manufacture of automobiles in this country during the past few years. The output has reached millions and is increasing annually. The housing



The Molded Concrete House of Today—A Rear View of the House Shown on the First Page of This Article

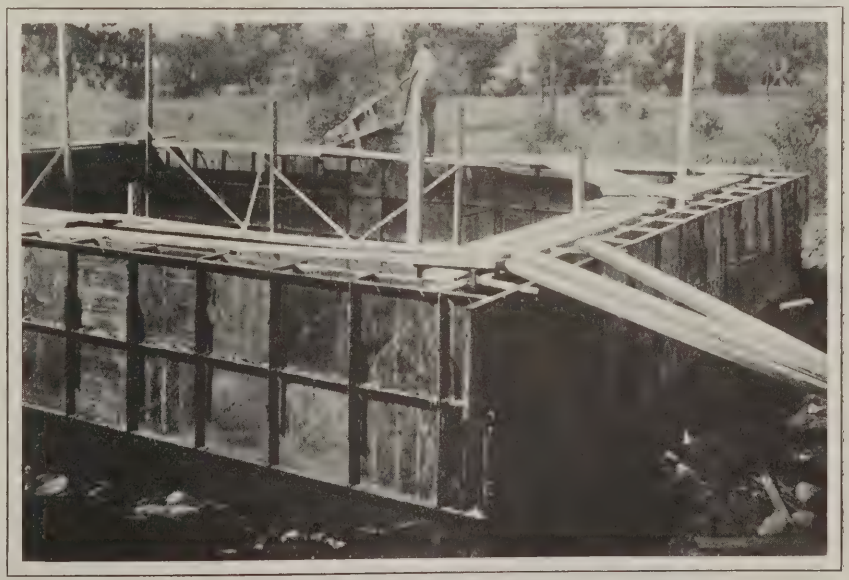
of these machines has widened to almost the same degree. The city flat dweller must perforce keep his car at the commercially conducted garage, but the town or country owner—and most of the machines are now going to the country—must provide his own shelter. The private garage, at first the ornate accessory of the country mansion, is now the usual accompaniment of the moderate sized dwelling and has descended to the purview of the most modest young architect. Its proper construction concerns him intimately.

It is argued by architects generally, says an Eastern newspaper, that the initial cost of constructing a two-car type of garage is only slightly larger when contrasted with that of a one-car building, while the additional room gained affords the convenience of putting up a visitor's car over night or anticipates the almost inevitable acquisition of a second car. The farther away one lives in the country and the greater the distance to a public garage, the more weight these arguments will probably have.

The standard width of automobiles varies little from 6 ft. 6 in., taking an over all measurement. The length is more variable, with 18 ft. as a maximum and 15 ft. as an average. If a clear space of 3 ft. is allowed around the car, which is none too much, and slightly more room is allowed in the rear for the space occupied by work bench and lockers, 13 x 24 ft. becomes practically a standard interior size for the one-car garage, and 23 x 24 ft. for the two-car type. Even if the car is below the average measurement it is wise to allow for contingencies.

The material of which the garage is to be built might properly match the house, but the desirability of fireproof construction, masonry or hollow tile with stucco finish, whose first cost is not much greater than that of wood should be considered. For the finish of the interior the masonry or tile will require only a coat of rough plaster, while if it is found necessary to build of shingle or sheathing on studding, an interior lining of sheet metal is probably the best and safest finish. A slate or tile roof is to be preferred to one of shingles for purposes of fire protection. Cement laid on concrete foundation makes a desirable floor. It should be laid with a slight slope, say ¼ in. to the foot, sloping to a 3-in. center drain. A help in keeping clean the floor of the garage is to carry up the cement against the wall to form a base 12 in. high, finishing with a rounded corner at the junction of wall and floor, thus leaving no difficult corner to clean. In the more elaborate garages the floor is sometimes made of 12 in. square quarry tile with a glazed tile wall wainscot.

Both swinging and sliding doors are in use, with advantage both ways. A small door for entering is desirable and excessive window space cannot well be provided, since light is needed at the work bench. Heating is also to be desired to preserve an equable temperature in cold weather. When the garage is within close distance of the house it is sometimes possible to run a line of steam pipes in a well protected conduit to the garage and thus provide a simple solution of the heating problem.



The Concrete Work in Progress, Showing the Steel Forms in Position

A Cement-Coated Country House

Foundations Are of Concrete, the Walls of Brick or Tile and the Roof of Shingles



THE subject of our colored supplemental plate this month is a country house of pleasing exterior and with roof lines so broken as to present a rather striking effect. The gables are finished in half timber with stucco in the panels. The picture affords an excellent idea of the architect's conception of the design while the plans, elevations and miscellaneous details upon the two pages which follow these comments clearly indicate the interior arrangement and the more important details of construction.

Layout of the Rooms

An inspection of the floor plans shows a commodious living room with open fireplace, a dining room well lighted at the side and rear and a kitchen which is so placed as to enable one to reach the front door without the necessity of passing through any other room. There is a commodious kitchen pantry and also a pot closet which, if necessary, might accommodate the refrigerator. A small door might be cut in the wall between it and the rear porch, so that it could be iced from the outside. The sink is well lighted, being placed under the double window at the side. The cellar is reached by means of a flight of stairs leading directly from the kitchen and running under the main stairs which rise from the hall.

On the second floor are four bed rooms and bath room, the position of the latter being somewhat unique. In the attic is ample storage room and also one bed room.

According to the architect's specifications, the foundations are to be of concrete, the first story main walls of brick or hollow tile, according to preference and covered with a stucco-finish. The trim around the windows, porch arches, etc., is to be tapestry brick. The second story also calls for trim of terra cotta with half timber effect and three coats of pebble-dash stucco finish the same tone as the first story walls. The roof is to be covered with shingles. The finish of the stucco is to be dark gray and the trim to be dark brown.

The Cellar

The cellar is to be excavated to the necessary depth to give a height of 7 ft. in the clear. The concrete foundations are to rest upon a footing course of concrete 12 in. thick and project 6 in. on both sides. All piers are to rest on footings 4 ft. below the ground.

The first and second floor beams are to be of 3 x 10-in. yellow pine and the rafters 2 x 8-in. yellow pine, all placed 16 in. on centers. The partition studs are to be 2 x 4 in. also placed 16 in. on centers, and doubled at all openings. The floors are to be of tongued and grooved maple, and the trim to be of a plain neat pattern with no base blocks. The kitchen is to be wainscoted with ceiling stuff 4 ft. 6 in. above the floor level. The sash are to be double hung and the lights are to be divided as shown on the elevations. The main stairway, balusters, rails, panelling, seat, etc., are to be of hard wood.

The Plastering

The plastering throughout is to be three-coat work with hard white finish. If brick are used for the exterior main walls they are to be furred out to receive lath for plastering.

The bath room is to have a tile floor and base 8 in. high and the living room mantel hearth is to be of square tile.

The house is to be piped for gas and wired for electric fixtures, the latter to be of the combination pattern, of the latest design. There are to be wall outlets for bed rooms and ceiling drops for the living and dining rooms.

The house is to be piped for the plumbing fixtures and have 4-in. run trap and fresh air inlet at the front of the cellar. The main vent lines are to be of 3-in. cast-iron pipe and the branch vents are to be of 2-in. cast iron. The main soil pipe is to be 4 in. and the branches to the tubs and sink, etc., to be 2 in. All fixtures are to be porcelain enameled iron of the latest type.

The house is to be heated by hot water with registers placed under the windows in all rooms, the apparatus to be of sufficient capacity to heat the interior to 70 deg. in zero weather. All pipes and registers which are exposed are to be bronzed.

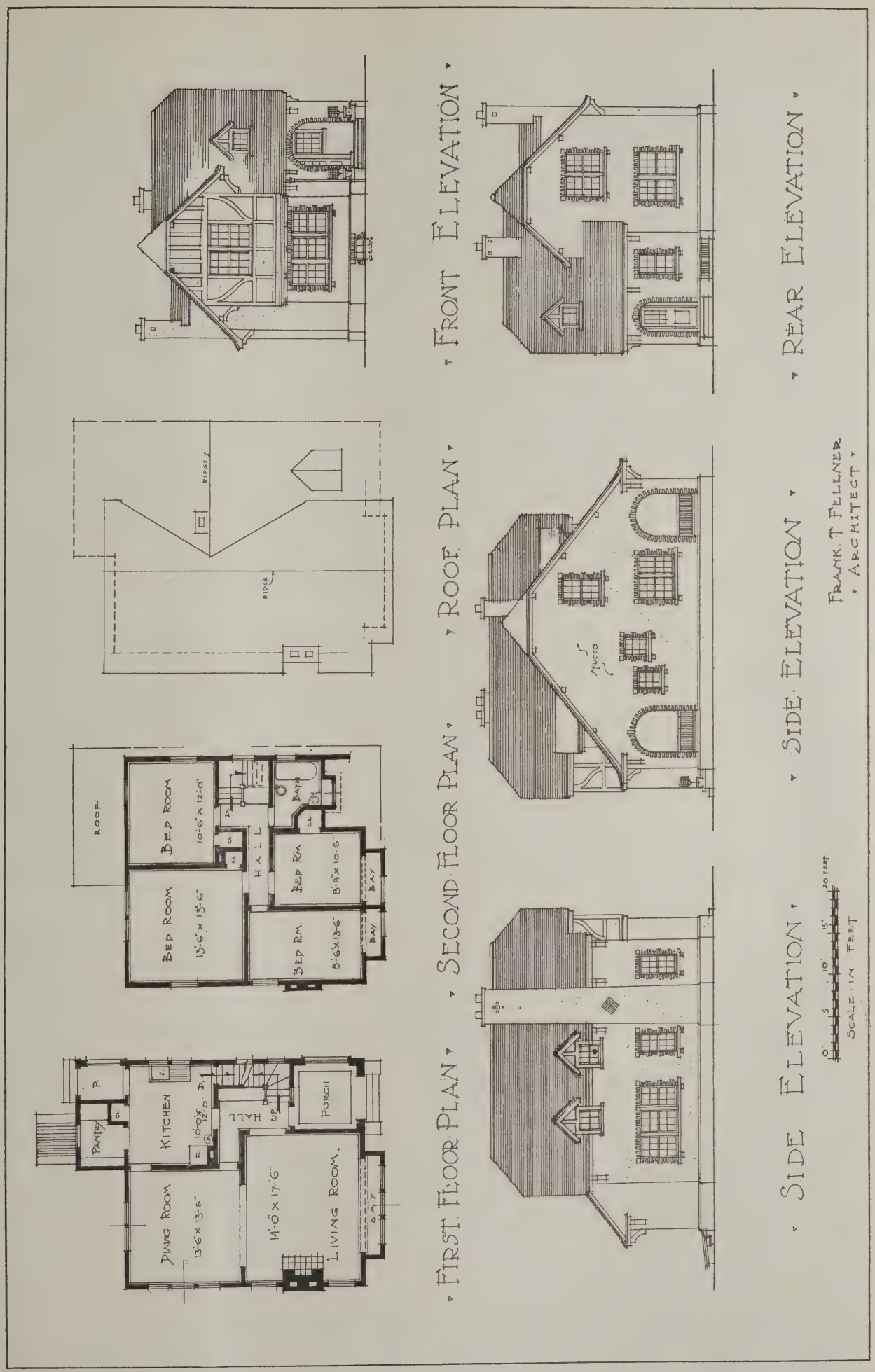
The Finish of the Trim

All exterior trim and woodwork are to receive three coats of dark brown paint. The doors are to be varnished. All inside trim is to be filled and varnished and the floors are to be varnished. The roof shingles are to be dipped in Cabot's stain before being laid.

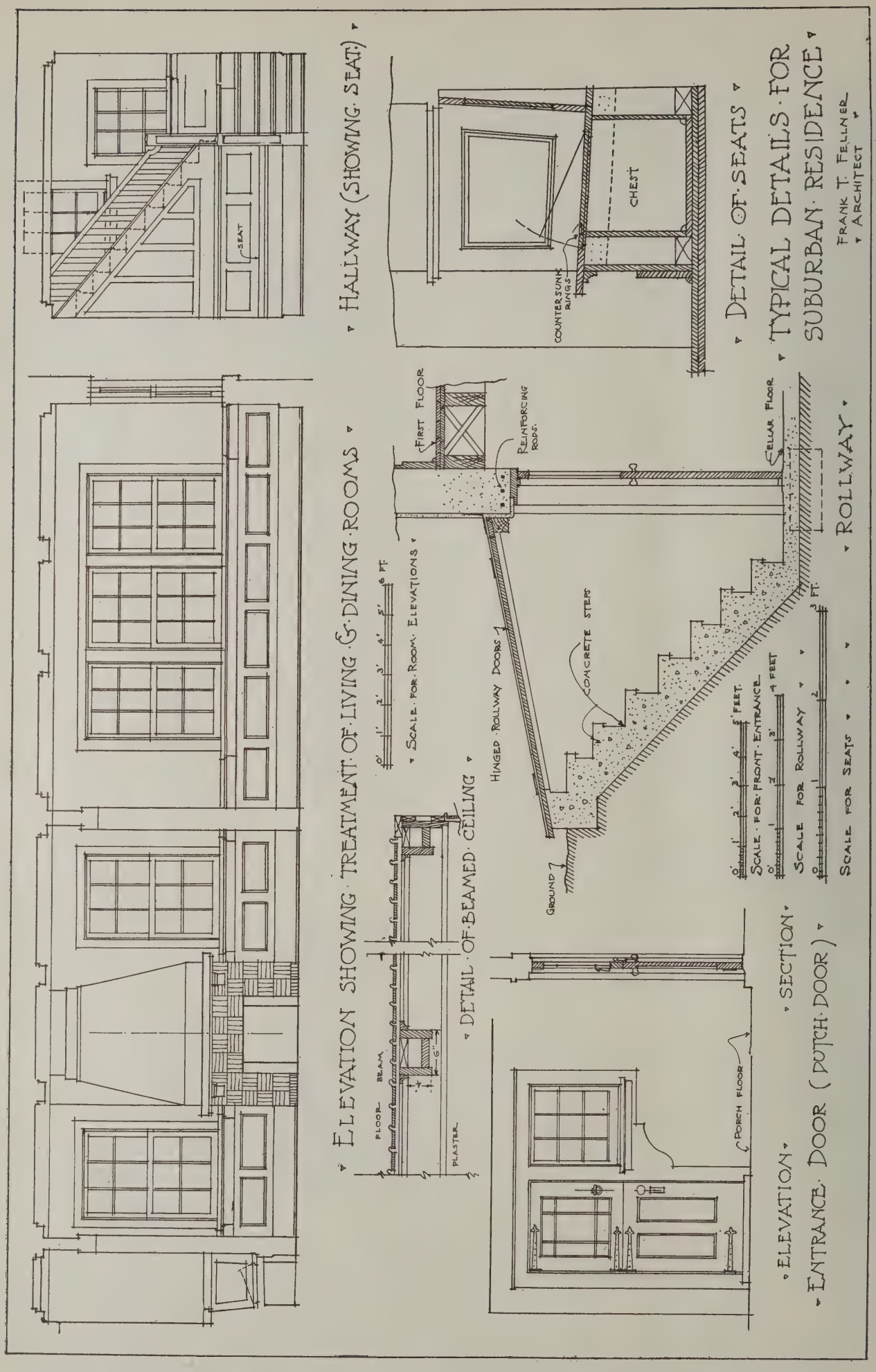
All ridges, valleys, hips, etc., are to be flashed with tin, painted both sides before laying. The gutters and leaders are to be of galvanized iron. The gutters are to be hung with adjustable hangers graded to the leaders which are to be of 3-in. diameter.

The architect estimates the cubic content of the house to be 29,625 cu. ft. and figures the cost on the basis of a unit price of 16c. per cubic foot.

The country house here described was designed by Architect Frank T. Fellner, 413 Caton Avenue, Brooklyn, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.



Plans and Elevations of the Cement-Coated Country House Shown on the Supplemental Plate

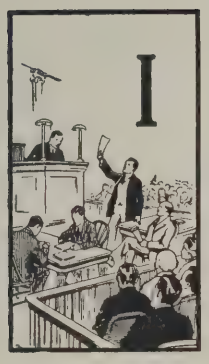


Miscellaneous Constructive Details of Cement-Coated Country House Shown on Supplemental Plate

Important Legal Decisions in 1915

Phases of Building Contracts Adjudicated—Responsibility for Personal Injuries—Rights of Builder's Surety

By A. L. H. Street



IN addition to decisions affecting the building trades and handed down in 1915 by courts of last resort already referred to in previous issues of THE BUILDING AGE, the year was productive of several other important decisions which serve to better establish legal principles which have a peculiar bearing upon those trades. A summary of these additional decisions is presented in what here follows:

In the case of Metayer vs. Grant, the Massachusetts Supreme Judicial Court recognized the rule that, in general, it is the duty of an employing builder to furnish a reasonably safe place of work for his employees, considering the nature of the work carried on, but holds that this rule does not comprehend negligent acts of fellow workmen by reason of which the place is rendered unsafe.

A contracting builder is bound to do agreed work in a proper and workmanlike manner regardless of whether there is an express warranty of quality of work in the contract, according to the holding of the Supreme Court of New Jersey in the case of Mayer Ice Machine & Engineering Company vs. Van Voorhis. The court said: "We do not mean to say that an express guaranty of work and materials is presumed to have been embodied in the primary contract. But its absence is immaterial; for where the contract fails to so specify, there is an implied agreement that the work shall be done in a proper and workmanlike manner."

Damages for Builder's Delay

Although it is a well-settled rule of law that a clause in a building contract subjecting the builder to a stated penalty for failure to complete the work by a given time will not be enforced by the courts when it is manifest that the actual damages sustained by the owner are much less than the prescribed penalty, the Appellate Term of the New York Supreme Court decided, in the case of Brooklyn Structural Steel Corporation vs. Lechtman, that provision for payment of $10 a day for inexcusable delay in finishing a building, as liquidated damages, will be enforced, notwithstanding there may be no proof of specific damage.

On the question of waiver of the owner's claim of damages, Judge Bijur said:

"The learned judge below was of the opinion that, as defendants had permitted the plaintiff to finish the work after the date originally fixed for completion, this constituted a waiver of the right to recover the amount of damages liquidated by the terms of the contract, even by way of counterclaim. I cannot concur in this view. * * * The acceptance of the work at the delayed day may quite properly be regarded as a waiver or abandonment of any defense to the action for compensation provided in the contract; but, as said by the Court of Appeals, defendant is merely thereby remitted to a counterclaim for his damages, and in the case at bar these damages are fixed by the very contract upon which plaintiff seeks to recover."

Omission to have oak floors laid in a dwelling-house by the time agreed upon for delivery of the building was held by the Washington Supreme Court to be such default as entitled the owner to claim damages, but that the claim was waived by releasing a mortgage given to secure performance of the contract. (Colby vs. Interlaken Land Company.)

On the question of conclusiveness of an architect's decision under a building contract, it was said by the same court:

"Where the parties by their contract constitute an architect, or other named person, an umpire or arbiter, to determine differences which may arise in the performance of the contract, and provide that his determination shall be conclusive, * * * the contract will be upheld as binding upon the parties. In this case, however, the contract does not go that far. It only provides that the completion of the house is to be 'evidenced by a certificate' of the architect. There is nothing in the contract which constitutes the architect an arbiter or umpire to determine differences which may arise in its performance. Neither is there any provision that his determination of such differences shall be final and conclusive upon the parties. A contract should not be construed so as to deny the parties thereto, or either of them, their day in court upon any differences that may arise, unless the contract clearly shows that this was the intent of the parties. Under the contract in the present case, the giving of the architect's certificate would doubtless be prima facie evidence of the completion of the building; and its refusal, in the absence of fraud or arbitrary conduct, would likewise be prima facie evidence that the building was not completed within the time specified."

But the certificate, under such a contract, is not conclusive on the point.

The courts have often declared that where a public building is authorized by vote of electors at a stated cost, a contractor must take notice of the limitation as to cost and cannot enforce a contract calling for a greater expenditure. It was sought to apply this rule in a suit brought by the builder of a school-house to recover against the school district for extras furnished under his contract. But the Oregon Supreme Court decided (Rush vs. School District No. 5 of Union County) that he was entitled to recover; it appearing that his total claim was within the amount authorized at an election, although the school board exceeded that amount by making independent contracts with other contractors for plumbing, heating and ventilating equipment. The court said:

"We conclude that plaintiff's contract was valid at the time it was executed, and that the subsequent action of the board of directors in exceeding the appropriation in other details cannot prevent plaintiff's recovery."

Scope of Compensation Acts

A carpenter casually employed by one not engaged in a building trade is not comprehended by the New York Workmen's Compensation Act, according to the view taken of the Act by the Appellate Division of the New York Supreme Court, in the case of Bargey vs. Massaro Macaroni Company.

Plaintiff's husband was employed casually as a carpenter to repair a building for defendant, who was engaged in the macaroni and saloon business, and was killed while doing the work. In dismissing plaintiff's claim to compensation under the Act, the court said:

"I do not believe that he was an employe in a business declared hazardous by the Workmen's Compensation Law. Clearly he was not engaged in the macaroni business, but his sole business was a carpenter. The company was not carrying on the carpenter business, or doing any carpenter work for profit; it was making repairs and improvements upon its real estate and hired a general workman for that purpose. If a man in a business not hazardous employs a carpenter to do some work upon his property, like fixing a window or door, I do not think the person performing the work is an employe engaged in the hazardous business of structural carpentry."

Owner's Liability for Labor and Materials

A North Carolina builder became insolvent while constructing a building under contract with a bank, and it was thereupon agreed that he should complete the work, but that the bank should directly pay for all labor and materials thereafter furnished. Under these circumstances, the Supreme Court of the State held, in the case of Carolina Hardware Company vs. Raleigh Banking & Trust Company, that such agreement on the part of the bank was enforceable by persons furnishing labor and materials, regardless of whether they knew of the agreement when they furnished the materials or services. By virtue of the bank's promise, the builder ceased to be an independent contractor and became the mere agent of the bank, so far as concerns liability on labor and material claims.

A decision of the Virginia Supreme Court of Appeals recognizes the principle that a contract should be interpreted in the light of any well-established trade custom in the locality which may fairly be presumed to have been known to the parties to the contract, except, of course, that application of a trade custom is excluded by any specific clause of the agreement at variance with it.

As decided by the Kansas Supreme Court, in the case of School District vs. United States Fidelity & Guaranty Company, a guaranty company, insuring the performance of a building contract, is not entitled to insist upon the withholding of the final payment, or that a percentage of the contract price shall be retained until the completion of the building, unless it is specially provided for in the contract with the guaranty company. In any event such company has no right to complain of the time and manner in which payments are made by the owner to the contractor, unless damaged in a material way by a departure from the provisions of the contract and of the obligation which it assumed.

A Concrete Stable with Hollow Walls

A Form of Construction Resulting in a Building That Is Warm in Winter and Cool in Summer

THE picture which we present herewith represents the hollow wall concrete stable with provision for 50 horses, recently erected for the Lederle Laboratories at Pearl River, N. Y., in accordance with the Van Guilder system of construction. The outside of the building consists of two 4-in. concrete walls separated from each other by a continuous air space 2½ in. wide. The walls are tied together across the air space every 2 ft. horizontally, and every 9 in. in height by means of steel wall ties. Both walls are also reinforced by steel wire and rods all around the building every 9 in. high, thus creating a very strong construction. On account of the continuous air space it was not necessary to fur and lath the walls before plastering, and as they contain nothing but concrete and steel they are referred to as absolutely fireproof and perfectly sanitary. The double walls produce an insulation which eliminates all dampness, thus making the stable building warm in winter and cool in summer and tending to protect the horses against sudden changes of the weather at all seasons. The floor of the stable is concrete and the roof is of tin.



Hollow-Wall Concrete Stable for Lederle Laboratories, Designed by Architect William E. Austin

The stable was designed by architect William E. Austin, 46 West Twenty-fourth Street, New York City, and the contract was executed by the Schouler Cement Construction Company of Newark, N. J.



The House During Progress of Construction and Before the Stucco Finish had Been Applied to the Exterior

How I Built My Ideal Concrete Home

A Fireproof House Designed by a Layman Who Had Well-Defined Ideas of His Own

By William G. Hoag

IT is the ambition of nearly every man to own a home, whether it be a simple three room cottage located on the outskirts of town or an expensive mansion fronting on the most aristocratic boulevard. It has always been my desire to build homes, not merely houses with roofs on them, but real homes in every sense of the word; homes in which the owners could enjoy themselves the rest of their days without envying the more pretentious dwellings of nearby neighbors or the expensive residences of successful friends. Too many houses I have seen were built simply to sell. Possessing a conspicuous sameness of design and arrangement, they were entirely void of individuality and in many cases lacked the numerous conveniences so much appreciated by the housewife and which are difficult and expensive to install in a completed house.

After looking through many such houses I wanted more than ever to build some that would be different from the ordinary run; houses that would contain the many, and nowadays necessary, conveniences that make a home livable and at the same time possess a permanency of structure and finish



The Concrete Home of Mr. Hoag as it Appeared When Completed and Ready for Occupancy

often thought of by the buyers only when the alteration and repair bills come in, and lastly houses that would be well built and at the same time sell at moderate prices.

I found with many others that concrete was the coming building material; that its failure to attain a wide degree of popularity in house building was due chiefly to two things—the unattractive appearance of a concrete or cement block wall and the tendency of such walls to become damp and moist on the interior.

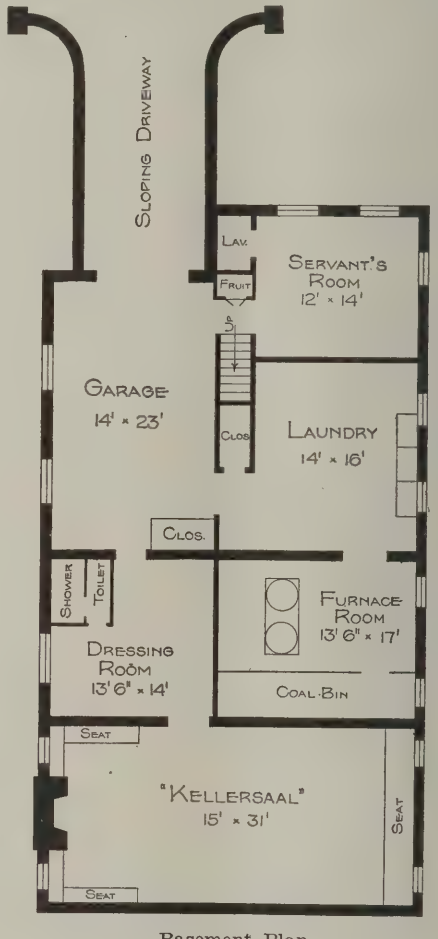
Early last year I became interested in a newly patented cement block which is made in a stripper machine. It is rectangular in shape and is made in various lengths and thicknesses, the most practical size being 20 x 4 x 10. The block is also made in quarter, half and three-quarter sizes, and by the longitudinal rows of vertical ventilating slots" and the "single relatively-deep ventilating channel" which intersects the above-mentioned slots.

A wall built of them affords an ideal surface for stucco. Instead of mortar joints to hide (this takes from ¾ to 1¼ in. of stucco and even then the joints are apt to show) it has a horizontal key every 4 in. and a vertical key every 20 in.

A stucco material made of cement and crushed marble, granite or stone is of the same nature and possesses the same elements contained in the wall. When the stucco is applied to the wall (⅛ in. thick is sufficient) the contraction and expansion of both are the same, thereby doing away entirely with the cracking and separation so commonly found in stucco work. By applying a water-proof stucco to the walls they become frost and moisture proof.



First Floor Plan



Basement Plan

How I Built My Ideal Concrete Home—Floor Plans—Scale 1/16 in. to the Foot

use of different palettes corner blocks can be made. It is described by the inventor as:

"A concrete building block of rectangular formation having on both ends and one horizontal face, a relatively-wide, continuous binder-receiving groove, a longitudinal row of vertical binder receiving openings of less width than said groove into which they open at their upper ends, the block being also formed with two parallel longitudinal rows of vertical ventilating slots located between said row of vertical openings and one side face of the block, said slots of both rows being intersected by a single relatively-deep ventilating channel extending from end to end of the block in its upper horizontal face and the slots in the two rows being arranged in staggered and overlapping relation to provide between them a plurality of connecting necks of relatively small cross-sectional area extending in a longitudinal direction when the block is viewed in plan."

A wall built of these blocks contains a monolithic portion and a hollow portion. The monolithic portion is formed by pouring cement in the "continuous-binder-receiving openings." The hollow portion of the wall is formed by the "two parallel The air chambers extending around the wall and on either side of the center absorb any moisture or dampness that may penetrate the waterproofed stucco coating. The interior of the walls are free from sweat and require no lathing. A skim brown coat or even the white coat itself can be applied directly to the walls. Interior walls covered with only a thin white coat (sand finish) and decorated in water colors show no signs of dampness. By using a thin coat of stucco on the outside walls and by eliminating the necessity of lathing the inside of these walls, and by putting on only a thin coat of plaster a considerable item of expense in the construction of a house can be materially reduced.

Walls of these blocks are fireproof, and permanent, and when covered by a good stucco look well

for years without requiring expensive patching jobs of cracked stucco or painting every two or three years.

The first house built was a five room bungalow, the basement, as in all the houses built, extending under the entire building. A heavy concrete footing was first put in, then the blocks were laid 5 or 6 ft. high and "poured." No blocks were laid between the joists, but a concrete water table was built around them, having an air chamber corresponding to that in the blocks. The fireplace and the massive columns in front were built of the blocks. The sills and coping were made of cement.

The roof was sheeted solid and covered with building paper and "concretile" shingles, as they clean, white, dry, plastered laundry with tubs and gas plate.

The bungalow was completed and a "For Sale" sign hung out. Many came and saw, and at least one fine old couple "was conquered." They had lived in rented houses all their lives and decided to spend their declining days in what they called a "real for sure home."

Then a second bungalow was built, similar to the first except that the joists were placed 16 in. on centers and a three-quarter block set in between the joists and sealed up with cement. The water table was then eliminated. This was built for a family who wanted "one like the little bungalow but larger." In addition to a sun room and sleeping



View in the Ideal Concrete Home of Mr. Hoag, Showing Built-in Buffet in Dining Room

are called, were laid. A white waterproofed butter-like stucco material was applied to the walls, including the part below the surface; above the water table fine rock of crushed granite was dashed in with a paddle. The sills, coping and water table were covered with a white float coat containing marble aggregate and the foundation covered with a deep red stucco. The green roof with its broad cornice formed a most attractive setting for the walls and trim of the house and "Edison's dream was realized"—a concrete house, fireproof, practical, permanent, livable and attractive.

A peep into the interior discloses a living room with beamed ceilings, fireplace and built-in seats, a paneled dining room with a massive built-in buffet, a built-in kitchen cabinet and linen closet and a porch or breakfast room there is a large attic which can readily be converted into two bedrooms.

As these two bungalows were being built and made into homes the ambition of the writer to build the cottage of his dreams grew stronger and could not be satisfied until the dirt began to fly from the carefully selected spot chosen for the site.

The lot, 100 x 150, faces west, with Fall Creek Boulevard running along the south side 150 ft. away. The front of the lot possesses several of those fast disappearing treasured shade trees. To build near the street, "as everyone else did," meant sacrificing some of these treasures. Over the protest of contractors and friends the excavation was begun some 80 ft. back from the street and extended nearly to the rear of the lot. After the ex-

cavation the joy of the builder-owner began. Not an architect or practical builder or natural born mechanic, but just a plain man with some ideas of his own, he waived aside the many friendly suggestions of those more experienced in the game, and began the building of "just what he wanted."

The basement was twice as large as necessary, the roof design could be improved upon; the openings for the windows were too large, etc., etc. These were samples of the advice he received. Advice and suggestions, to the contrary notwithstanding the building progressed as originally planned, and after weeks and weeks of worry and constant struggle to get things done as he wanted, the writer stood in the street running by the "place" and viewed the result—a long, low sweeping bungalow, 32 ft. wide and 60 ft. in depth, with a hip roof, gabled in front and on one side.



View of Fireplace "Nook" in Living Room in the Ideal Concrete Home Home of Mr. Hoag

The exterior is a light cream stucco with sills, coping and trim in a light gray. The stucco has been acid washed, bringing out the marble aggregate contained in it. When the sun is shining the walls appear to be covered with a myriad of tiny sparkling diamonds. The lot slopes gradually to the back and a winding walk leads to the broad front porch extending across the front of the house. A gabled roof covers half the porch, the rest being open. Massive columns inclose the open part of the porch and support the roof. The floor is in red—more trouble to keep clean, no doubt, but much more inviting than the ordinary cement porch.

A brass knocker on the huge one-piece oak door causes or, perhaps tempts the visitor to overlook the electric button and to announce his arrival with a vigorous "bang" of the knocker. When the front door swings open the guest is ushered directly into the spacious living room. The south wall of the room has a multiple window in a 10 ft. opening, giving a splendid view of the boulevard and creek beyond. A huge plate window, 7 x 3 ft., permits the western sun to throw much of its sunset glow into the room. After his coat and hat have been hung in the cloak closet opening off the living room opposite the front door, he looks for a comfortable spot and immediately hies himself to the nook in the north end of the room. Here is a fireplace built of blocks and covered with a cream stucco, troweled smooth, into which chipped granite has been thrown as thickly as possible. The hearth is in green with a border of narrow red bricks. The counter shelf of the fireplace and the top of the bookcases on either side are built in one piece 15 ft. long. The nook is formed by 4-ft. paneled walls extending from either side out into the room. Doors built on the living room side of these walls form a writing desk and music cabinet. These walls have square posts which in turn support a heavy beam against the ceiling. Seats with paneled backs and removable lids are built on either side of the nook.

French doors lead from the living room to the Blue dining room with its mass of windows stretching across the entire south wall; between the paneled strips around the room is a bluish putty tone grass paper with tapestry paper above to match.

In these days of breakfast rooms the dining room, like "ye old time" parlor, is used only on special occasions.

The woodwork in both living room and dining room is selected red gum, stained circassian walnut finish. This is fully as good looking as quartered sawed oak and not as expensive.

If the guest whom we have almost forgotten wishes to "see the house" he is taken from the dining room to the back hall, which might be called the "hall of a thousand doors." From it doors open into both bedrooms, bathroom, kitchen, breakfast room, sun porch, dining room and to the basement stairway. If the guest has been expected and Milady has everything "cleaned up" she probably shows him the kitchen with its old ivory enameled walls and woodwork, its built-in cabinets on either side, its one-piece sink, located beneath the window and between the cabinets. The floor is a red concrete composition with cove base. Adjoining the kitchen is the breakfast room which can also be reached from the hall.

Across the hall from the kitchen is Milady's special pride and joy—the bathroom. The floor and lower part of the side walls are covered with a green composition flooring with a recessed tub in one corner. The room has the appearance of a huge green bowl. There are no joints or cracks or corners in the room where dust and dirt can accumulate. With shower bath attachment, medicine cabinet, mirror, linen closet and laundry shute this room, while small, is quite complete. The woodwork, as in the kitchen and bedroom, is finished in old ivory enamel.

Milady's bedroom adjoins the bathroom on the left. This room is large and airy, with plenty of wall space for massive furniture. Through the roomy closet opening from this room the sun porch in the rear can be reached.

A cozy built-in seat in the rear hall, with telephone attached and mirrored door leading to the basement in full view affords a popular stopping place for the feminine contingent of the household.

The walls, with the exception of those in the dining room, are sand finished and decorated in oils, with gray and old ivory predominating.



How I Built My Ideal Concrete Home—View in the "Kellersaal" in the Basement

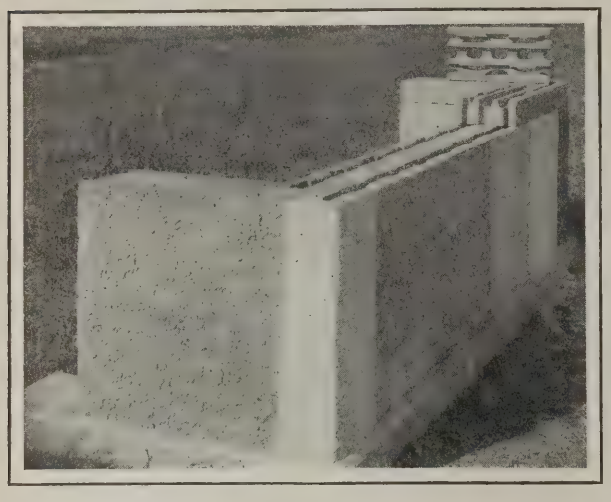
One of the many hobbies of the owner is electricity. All the rooms have ceiling lights, bracket lights, floor receptacles for lamps and the dining room and breakfast room have receptacles for percolator and toaster attachments. A large indirect bowl and floor lamp afford ample light for the living room, which can also be well lighted by the numerous wall brackets in the room.

Three-way switches save many steps in the turning on and off of the many lights.

The windows are of the casement type, opening out, and slide back and forth on a track. All the windows in an opening can be pushed to one side or the other, leaving the entire view through the window space unobstructed.

The house having been fully explored the guest

is requested to "sit down and visit" but no—a nudge and a wink from the erstwhile silent host causes Mr. Visitor to suggest a visit to the basement, commonly thought of only as a haven for dirt, coal dust and cob-webs. The stair-way leading to the basement opens into a large room, 16 x



How I Built My Ideal Concrete Home—Showing the Hollow Wall Construction

20. This is the garage and is reached by a sloping driveway from the rear, walled on either side. Here can be found the tool, fruit and trunk closets. To the right of the stair-way is the servant's room, a large light room having all the appearance of a ground floor room (made possible by the slope of the lot). Like all the basement rooms its walls are plastered, its windows and doors cased and its woodwork stained and finished. A large closet containing toilet and lavatory opens from this room.

The Garage and the "Kellersaal"

The visitor curious and perhaps impatient to learn the significance of the "nudge and wink," follows the host past the laundry with its tubs, gas plate and electric washer and soft water motor which supplies rain water to all parts of the house from a 150-barrel cistern in the rear; past the furnace room with its twin furnaces regulated by a thermostat, through the owner's dressing room, equipped with shower bath and toilet, into the largest room in the house directly under the living room and called by the somewhat proud designer the "kellersaal." In one end is a large fireplace with wide seats 8 ft. long, built along the side walls. Across the other end is another seat 15 ft. long, with compartments beneath for storing fruit and vegetables. The walls are finished in a rough red water-proof float coat. A billiard table, some lounging chairs, a card table and cellarette make this room what the owner intended—a living room for men, where they can "tickle the ivories," "sit in" a quiet game, smoke and drink an occasional toast without fear of disturbing the rest of the family or arousing the ire of the dirt despising hostess.

Seated in a comfortable roomy chair before a blazing, crackling log of real wood, the guest accepts with a little urging a good cigar and a bit of "good cheer" from the nearby cellarette and assures his host that while the surroundings above are beautiful he hopes on his next visit to again be invited to the "regions below."

Chicago's Coming Cement Show

At the ninth annual Cement Show, to be held in the Coliseum in Chicago, Feb. 12 to 19 inclusive, there will be five general divisions. The first of these will be the Road Division, containing models, actual sections and ample data to give the visitor a clear conception of concrete pavement types. The second will be the Structural and Decorative Division, showing examples of interior and exterior decoration; cast concrete specimens typical of the work which architects, particularly in the East, are using; surfacings with special aggregates and with characteristic treatments displayed in a manner which will show both the finished surface and the processes of production; third, the Rural Contractor Division, which will bring out the possibilities of concreting in rural districts; fourth, the Concrete Unit Division, which will treat of the methods of treating concrete units, and fifth, the Good Concrete Division, which will demonstrate, by means of a 2000-lb. testing machine and other laboratory apparatus, the better and more economical concrete results from the use of graded aggregates than from bank run materials.

New Buildings for University of Chattanooga

The building committee of the University of Chattanooga early in December awarded the contract for two new campus buildings to T. S. Moudy & Co., of Chattanooga, Tenn. The contract calls for the completion of the work by July 1. The buildings will be of rough texture with stone trimmings and of slow burning construction with slate roofs. One structure is the Library and Administration Building and the other the Liberal Arts Building. With



Rear View of House Showing Approach to Basement Garage

the exception of the gymnasium already erected, these buildings are the first step in the general plan for revision and enlargement of the Chattanooga Department School plant made possible by the million dollar endowment secured a few years ago.

According to official statistics, 49,275 new buildings costing $187,415,861 have been planned in Minneapolis, Minn., during the last twenty-five years. Of this number 32,571 were dwellings.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

THE flange may be made solely of angles extending the whole length of the web plate, or of angles with plates riveted to them, the latter type being adopted when angles alone will not be sufficiently strong. The plates seldom extend the full length and if more than one is used the outer plates are very short, the lengths increasing progressively as they get closer to the angles. These plates are known as cover plates and when different thicknesses are used the thinner plates are on the outside.

The resisting moment is determined as follows: One-eighth the area of the web is considered as forming part of the flange. This is the usual custom but some engineers use only one-tenth and some one-twelfth.

$$M_r \text{ of web} = \frac{Rbd^2}{8}$$

$R = f/6$.
b = thickness of web plate.
d = total depth of web plate.
r = unit fiber stress (usually 16,000 lb. per square inch).

$$M_r \text{ of angles} = Adf$$

A = area in square inches of the two angles on one edge of plate.
d = distance center to center of gravity of the angles on the upper and lower edges of web plate.
f = unit fiber stress.

$$M_r \text{ of cover plates} = Adf$$

A = area in square inches of plates along one edge of web plate at middle of span.
d = distance center to center of gravity of cover plates.
f = unit fiber stress.

The total moment of resistance of the plate girder is the sum of the moments of resistance of the web, the angles and the cover plates.

The rivets used to connect the flange angles to the web and to connect the cover plates to the angles must be spaced to take care of the shear, this being accomplished by using the following formula,

$$p = \frac{rd}{V}$$

in which
V = total vertical shear at the point considered.
r = the resistance of one rivet.
d = distance in inches between the center of the upper row of rivets and the center of the lower row of rivets.
p = pitch, center to center of rivets, in the flange.

The bending moment due to uniform load varies as a parabola and as plate girders are generally designed for a uniform load the cover plates are varied in length to provide enough area for tension or compression. They extend a short distance past the point where the area is no longer required, to

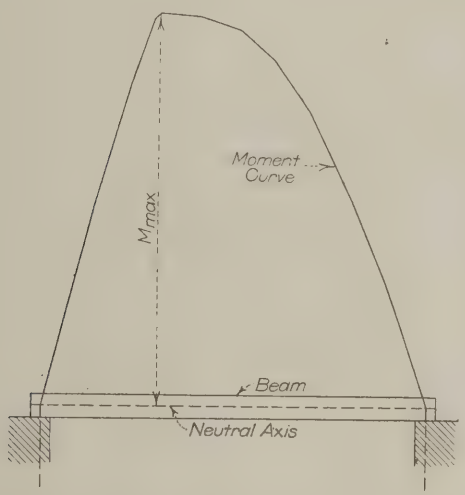


Fig. 56—Moment Curve Due to Uniform and Concentrated Loads

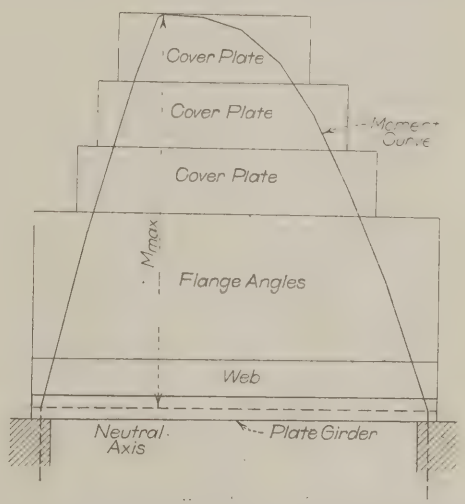


Fig. 57—Graphical Method for Obtaining Lengths of Plate Girder Cover Plates

Design of Beams, Girders and Trusses

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 61 of the January issue.

provide for proper connections. By having the plates stop when they are no longer required some weight is saved and economy effected. When concentrated loads must be cared for in addition to a uniform load the process is altered.

Let A = total area of angles and cover plates in one flange at mid-span.

a_1 = area of shortest cover plate.

a_2 = area of second cover plate.

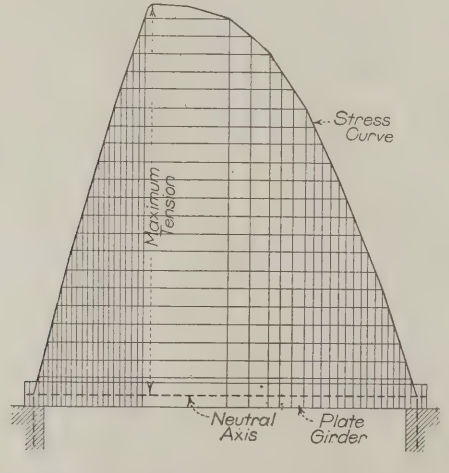
a_x = area of longest plate, the plates being numbered progressively from 1 to the end, x being used to signify any general terminating number.

Similarly l_1, l_2 ——— l_n, etc. = lengths of the plates, the letter n being used to designate the general number applying to the last plate, thus l_n = length of the last plate considered. Then

$$l_n = \frac{L}{\sqrt{A}} \times \sqrt{a_1 + a_2 \text{ ——— } a_x}$$

The angles always extend full length of web plate.

In spacing rivets in the flanges of plate girders it is common practice to have the rivet spacing uniform between stiffeners, the amount of vertical shear considered being taken at each stiffener. The minimum distance between centers of rivets is three diameters of the rivet but not less than 3 in. for



Design of Beams, Girders and Trusses—Fig. 58—Graphical Method for Spacing Rivets in Plate Girders

⅞-in. rivets and 2½ in. for ¾-in. rivets. In the flanges the maximum pitch should not exceed six times the diameter of the rivets. The maximum pitch at ends of cover plates should not exceed four diameters of the rivets for a length equal to twice the depth of the girder. The maximum pitch in stiffeners is determined by the loading, if any, but should not exceed a maximum of 4½ in. The load on an intermediate stiffener, and the load plus the end shear transmitted to an end stiffener is divided by the bearing or shearing value of the rivet to obtain the number of rivets. These are equally spaced, but the maximum spacing is 4½ in.

When it is necessary to splice the web of a plate girder the splice plates on each side of the web must be proportioned so the rivets will not be unduly stressed. The moment causing vertical bending in the girder makes the stress in the rivets greater as the top or bottom is approached. Sometimes an additional "moment splice" must be added on the sides of the web close to the flange angles.

The lengths of flange cover plates and the spacing of rivets may be done graphically. In fact the graphical method for obtaining the lengths of cover plates is that commonly used by designers. Fig. 29 shows a moment diagram on a beam carrying a uniform load and several distributed loads. Fig. 56 shows the combined curve for this condition, so that it will not be necessary to measure up and down from the neutral axis and add the lengths.

The moment curve for a plate girder is similarly drawn. For a uniform load the curve is a parabola, so it is necessary to draw only one-half the length. All horizontal measurements are made to the scale of the drawing and all vertical measurements are made to the scale used for the bending moment. Make the drawing no larger than is necessary to obtain accurate data.

Setting Off Lengths of Cover Plates

To set off the lengths of cover plates draw a vertical line through the point of maximum bending moment, Fig. 57. Begin at the bottom and set off first the amount of moment carried by the web (one-eighth, one-tenth or one-twelfth, according to specifications) and above this set off the amount carried by the flange angles. The number of cover plates having been determined set off in succession the amount of moment carried by each. Through the points fixing the amount of moment carried by the web and the angles draw horizontal lines to the ends of the span. Through the points fixing the amount of moment carried by each cover plate draw horizontal lines beyond the moment curve 2 or 3 ft. This projection allows a place for a few rivets so the plates begin to be effective when needed.

The lengths of the cover plates are scaled from the diagram. When the plate girder carries a moving load on top it is usual to have the top cover plate next the angles extend the full length of the girder. This covers the angles against the entry of moisture in the joints and stiffens them near the ends against the effects of deflection of the frame carrying the load.

Diagram for Spacing Rivets

A similar diagram may be used for spacing rivets. The vertical scale represents the total maximum tensile (or compressive) stress in the girder, instead of the maximum moment. The number of rivets necessary to resist this stress is determined by dividing the stress by the safe allowable stress (shearing or bearing) on each rivet. The vertical line is divided into as many parts as there are rivets required. Through the division points draw horizontal lines, Fig. 58, to an intersection with the boundary curve. From these points of intersection with the boundary curve drop vertical lines to the base. A rivet will be used at each intersection thus determined. A similar method may be used for spacing stirrups in beams of reinforced concrete. The moment diagram for obtaining the lengths of cover plates may be used without change for determining rivet spacing by adopting a scale for the vertical lines proportioned to the ratio the total stress bears to the moment. By total stress is meant the product of the area of the flange angles plus the area of the cover plates, multiplied by the unit stress.

(*To be continued*)

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Framing the Bottom Ends of Rafters

From G. L. McM., Tacoma, Wash.—I have no desire to enter into a controversy with Mr. Barry in regard to his methods of roof-framing, but as I have worked in Vermont, New Hampshire, Massachusetts, Iowa, California, British Columbia and in this State, also have been framing roofs for forty years, and seeing others frame them, without ever having found it necessary to back a hip, I think when I see a man of Mr. Barry's ability giving a rule as of general applicability that I know would not serve 99 out of every 100 jobs that have come within my observation or experience, I am justified in calling attention to the fact. Had Mr. Barry, in giving the rule said that it would only apply *after the rafter was backed,* there would have been no probability of his misleading any one. On rereading his October article I notice that he makes a similar omission when he says that "no hip less than 2 in. thick needs to be backed *if the vertical distance at right angles to the seat* is made equal to that of the common rafter." The italics are mine. He neglects to say that the distance must be measured at that point where the edge of the hip cuts the edge of the plate—not at the plumb cut of the hip as the figure referred to would indicate—see Fig. 2 in my article in the November number.

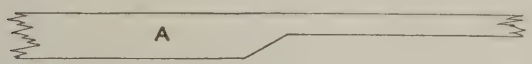


Fig. 1—One of the Methods of Framing the Bottom Ends of Rafters

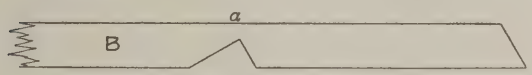


Fig. 2—A Second Method of Framing

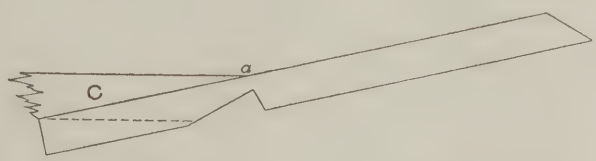


Fig. 3—Method Used in Connection with the So-Called "Bungalow Style"

Framing the Bottom Ends of Rafters—Showing the Three Methods

If Mr. Barry never saw a "work line" used on hewed timber, he either never saw much framing done on that kind of timber, or else it was framed by "scribe rule," for no workman, in my estimation, can do a good job of framing on hewed timber and work to the hew line. His brace seats are cut 1¼ in. deep because they were laid out from such a line, or I miss my guess.

As to what Mr. Barry says about surplus material on sawed lumber, and that kind of lumber varying in size, it is twenty-five years since I have seen any sawed dimension lumber brought on to a job, that was not sized at the mill to even widths, and in most cases even thicknesses, with the exception, perhaps, of some very small, cheap jobs and occasionally some timbers for use as posts or girders where the variation in size did not matter or where it would only be necessary to size at the place where the bearing came on a post. The last job of heavy framing I had anything to do with the girders were 14 x 16 and all were sized before they came to us. When carpenters wages are from 40 to 50 cents per hour and the mills size lumber for from 50 cents to $1 per M it does not pay to use unsized lumber.

With regard to what he says about rafter finish and fascias, we use three methods of framing the bottom ends of rafters, as shown in Figs. 1, 2 and 3. Where a "cottage jet" (or cornice) is to be used and the plancier is to be applied directly to the underside of the rafter end the form, Fig. 1, is used. In this case the valley being framed the same way the under side of the projection will be on a line with the underside of the common rafters, and at the hip it will only be necessary to slightly bevel the end of the plancier to make a fit. Where a "box jet" is used, the plancier is applied to lookouts and the size of the rafter projection "cuts no ice," then the form in Fig. 2 is used. The form in Fig. 3 is used where the construction is of the so-called "Bungalow" style, the rafter end being a separate piece both where a sweep is made in the roof, as shown, and in most cases where the rafters are finished straight. No fascia is used below the gutter, so that any difference in width of the common and hip or valley ends makes no difference. I therefore fail utterly to see where Mr. Barry gets any ground upon which to rest his assertion "that unless the hip is backed and the valley grooved the fascia will be too narrow." I should add that in "Bungalow" style of cornices the roof boards form the plancier and the entire rafter end below the frieze is exposed.

Hanging Glass Doors

From J. H., Elk Point, S. D.—I have never before asked a favor through the Correspondence Department of THE BUILDING AGE, but as there always must be a first time I come now in regard to the proper method of hanging glass doors. What has been the experience of the practical readers in regard to this point? Which side of a glass door should be outside? I learned the trade

in Holland where they hang the doors with the "stop" outside for the reason that the rain which runs down the glass may escape again outside, but if the molding is placed outside the water is forced inside. I would state, however, that I have seen doors in this country hung both ways.

Answer.—The question raised by our correspondent is one concerning which there exists a considerable diversity of opinion among carpenters and builders in this country as it resolves itself largely into a matter of taste. As a usual thing a glass door is hung putty side out, but it is possible to conceive of conditions which would readily change this plan.

If the raised molding corresponds with the other doors in the vestibule, hall or room, then it would seem that the outer door should be hung with the raised molding on the inside. If, however, there is nothing of this kind to serve as a guide and our correspondent desires to make the exterior as attractive as possible, we would suggest hanging the door with the raised molding out. As already intimated, however, it is largely a matter of taste and we shall be very glad to have the practical readers express their views on the subject.

Average Day's Work for the Carpenter

From Contractor, Moffitsville, N. Y.—In discussing the questions of "Builder," Danville, Ill., I will give him some idea as to where to put his figures, and if he goes beyond this it will be at the expense of his profits. I have built in Missouri, Kansas, Nebraska and Minnesota, as well as in various sections of New York State, and when I get through estimating a building using my own day's work as a standard I cut it in two.

For an 8-hr. day a man will put 400 to 900 sq. ft. of material for a balloon frame; framing and putting up roof 300 to 700 ft. material.

Horizontal rough sheathing 700 to 900 ft., and if placed diagonal half of this.

Matched rough sheathing 300 to 700 ft., and if placed diagonal half of this.

Rough roofing about 1000 ft., and if matched 800 ft.

Rough flooring 1200 ft. and 4-in. matched flooring 500 ft.

2¼ in. matched hard wood, one room 10 x 12, 12 x 12, 12 x 14 ft. laying up to base.

Clapboarding 4 ft., 5 ft. and 6 ft. lengths milled ends 50 to 200 sq. ft. of wall.

These clapboards are 4½ to 5½ in. wide and laid 2½ in. to the weather.

Of 6-in. clapboards unsquared ends laid 3¾ in. to weather the same number of square feet should be laid.

2000 to 2500 shingles on ordinary roofs; compound roof half of this.

1200 ft. on side walls keeps a man hustling all day.

75 to 100 lineal ft. 4 member cornice; double this for corner strips.

Set 8 to 12 window, door or door jamb frames, and fit and hang sash for these 4 doors with 3 butts and mortise lock, 2 ft. 6 in. x 6 ft. 6 in. and larger.

Will case with Eastlake one side of opening an hour; ¾ door 5/4 window.

Will base 2 members 3 times as many rooms as he will floor; 3 members twice as many.

Will fit and hang one pair of sliding doors, but twice as many single doors. Will put up track for either of these.

Durability of Metal Lath for Exterior Work

From G. R. M., Rapidan, Minn.—What data can you give concerning the life of metal lath for exterior work? I have a contract in hand for a stucco exterior on metal lath but my client has been hearing reports of its rusting and rotting out and I wish to learn what has been the experience in regard to the point.

Note.—It is rather surprising to learn the extent of the prejudice existing in many sections against metal lath based on the supposition that it will rust out in a short time and cease to be of any value for holding plaster or stucco. Where objections have been made it is very rarely that a case is found where it may be actually and definitely proven that the metal lath has rusted out. Where such cases do occur it is generally found to be due to the use of a light weight metal lath or one that was not protected by painting or galvanizing.

Another cause is the use of a very lean mixture of stucco or too thin a coat so that the stucco itself is of no real protection to the metal.

Those engaged in the manufacture of metal lath have records of buildings on which metal lath was placed eighteen and twenty years ago and which is in perfect condition to-day. In several instances where it was found necessary to repair stucco houses and the stucco was removed the metal lath underneath was found to be in good condition.

Proper Method of Laying Shingles

From W. H. Blair, Janesville, Wis.—I notice that in the Correspondence columns of THE BUILDING AGE many of the readers have given their personal experience on the above subject, but none of them accord exactly with what I discovered many years ago to be good practice. In my opinion 16-in. shingles will make just as good a roof, exposed 5 in. or less, but other shingles should be exposed according to their length and perfection.

The form of specification which I have adopted for general practice is as follows:

> The roof shall be covered with———grade of shingles laid 4½ in. to the weather and nailed with two 3d galvanized nails to each shingle; nails to be driven 10 in. from lower end and ½ in. from edges of shingle. Side laps shall be not less than 1½ in. In laying shingles care must be taken to allow for expansion by moisture.

Many in the trade do not agree with me in the manner of nailing, but since adopting this method more than thirty years ago my observation is that every test has been favorable.

Why the Chimney Tops Overhang

From D. P. B., Redford, N. Y.—I notice that the explanation which I gave of the "nodding" chimneys of "E. A. N.," Rockville, Conn., does not appear to be satisfactory to him. I gave him a purely scien-

tific opinion. The problem is pure psychology. On my shelves are many volumes on the subject and among them is one by Ladd, who taught and wrote down there in the vicinity of "E. A. N.'s" crooked chimneys. Some day I may give some of Ladd's figures to show how the mind is often deceived by sensation. I should like to see the name of a scientific man signed to a statement that brick chimneys haughtily hold their heads erect for 23 years and then begin to flirt with the Atlantic Ocean.

Cold acts on all sides of a chimney about equally. If cold put out of plumb the chimneys the correspondent mentions, then there would not be a plumb chimney in the entire north. A body will continue in a state of rest or motion unless acted upon by some external force. Cold is a state of absolute rest. Water will expand a little in freezing; brick and mortar will contract. During the last five years the chimneys have been noticed as being out of plumb, but that hardly proves that they were ever plumb.

The statements of "W. B. B.," Southampton, N. Y., are open to severe criticism. It takes some chimneys 23 years to get into the same condition that others do in five years. In getting into the condition he imagines, they would be fractured all around and probably blown down years ago. In addition,

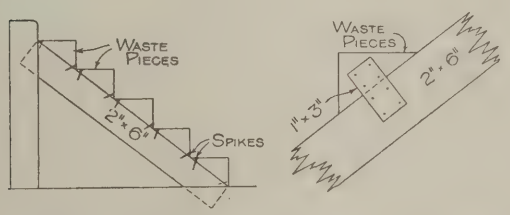


Fig. 1—Waste Pieces Used for Construction of Outside Cellar Stairs

Some "Kinks" for the Carpenter

From H. C. B., Union City, Ind.—There is an old saying to the effect that "There are tricks in all trades but ours," but carpenters at the present day do not consider that it applies to their line of work for the reason that they are learning many new kinks every day. I wonder if my brother chips ever stop to think that the waste pieces sawn out of a set of stair horses would make a good set for the cellarway if spiked firmly to a 2 x 6? The waste pieces of 2 x 4's will answer for a double studding in the corners and around the windows to which to nail the baseboard and casing instead of using a full length piece of material. See Figs. 1 and 2.

If the mechanic will take his rule and a piece of blue chalk and mark the center of each stud upon the floor before a building is plastered, it will prove of great benefit when he comes to finish the house.

A piece of building paper a yard wide placed upon the floor around the room just before the building is plastered and then removed as soon as the work is completed involves but very little expense, and it will keep the grit from being ground into the floor.

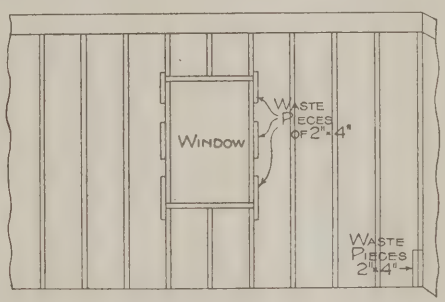


Fig. 2—Showing How Waste Pieces May Be Utilized in Place of Double Studs at Openings, Corners, etc.

Some "Kinks" for the Carpenter—By "H. C. B."

it is not necessary to go to the public to find that out. Furthermore, the east side of a chimney gets no heat from the sun in cold weather. At this very writing the sun is 22 deg. south of east, and before it can give any heat at all it is south of the chimney. For this item I examined several ruins which have not had a roof for 30 years, and the trace of the trowel could be seen on the joints. One wall was plastered on the bare rock and the plaster is still in good condition.

Chimneys disintegrate at the top all around and when plastered inside will stand up till the brick has disintegrated and blown down. If brick are set over, 1/16 in. per course, the chimney will lean 2 in. in 5 ft. When building the base the plumb and level are usually employed and then afterward laid aside. A chimney can be put out of plumb and yet the courses be level. There is one cause that possibly could produce the result, but it does not wait 23 years to act.

Details of Grape Arbor

From John Wavrek, Jr., Pa.—In connection with my comments appearing in the December issue of THE BUILDING AGE touching the construction of the grape arbor indicated in Fig. 6, the dimensions should have read 5 ft. 3 in. instead of 15 ft. 3 in.

This applies in cases where no sub-floor is laid. The scheme also saves a lot of work as the paper is easily picked up.

Location of Registers and Furnaces

From Ernest McCullough, Chicago, Ill.—The remarks by "J. F. H.," Union City, Ind., on location of registers and furnaces, which appeared in these columns some time ago, are entitled to consideration. There is reason for considerable dissatisfaction with warm-air furnace heating, but this is because it is not as easily controllable as steam or hot water heating. Hot air furnaces are installed in nearly every instance because of the low first cost. This the contractors know, and it is not hard to persuade owners that a guarantee (so-called) for a temperature of 70 deg. with 0 deg. outside temperature is just as good when made by a man who installs a complete heating plant for $275 as when made by a man who proposed to install a plant costing double that amount. Therefore, the ignorance of the owner is the first reason why hot-air furnace heating is so often unsatisfactory.

The first great requisite is that the horizontal run of the hot-air pipes shall be as short as possible, and that the runs shall be as nearly as possible equal in length. The logical place for a furnace is then as near as can be to the center of the house.

No pipes should be horizontal, but all should rise to the vertical pipe in the walls. This shortens the runs, because the head room in a basement is low and most furnaces are high. The pipes should leave the hot-air chamber as close as possible to the top and the tops of the pipes should be at the same height, thus the bottom of a 12-in. pipe will be 4 in. below the bottom of an 8-in. pipe. These rules are too frequently violated in hot-air furnace installations. In a low basement the furnace should be placed in a pit so the pipes may leave the top of the hot-air chamber properly and have a good grade to the junction with the vertical pipes.

The vertical pipes should not be square, and if it is not possible to have round pipes in the partitions then use ovalled pipes, which are made by flattening round pipes. There is a downward current of cold air in every pipe and this cold air seeks the corners of rectangular pipes. All pipes should be covered with two layers of asbestos paper instead of the single thickness generally used. These two thicknesses should be applied on different days, that is, the second should not go on until the first is dry. It is also advisable to use double pipes, but this adds to the cost. All runs from the furnace should have a covering of asbestos paper applied each year for two or three years, the spaces between the layers assisting in the insulation and each gain in insulation is shown favorably in the coal bills. If the pipes are double then the outer pipes should have not less than two layers of asbestos paper.

Advantage of Large Pipes

Hot air flows in pipes because of the difference in weight of cold air and warmed air. This produces a very low velocity, and long horizontal runs further reduce it because of surface friction. Large pipes are therefore an advantage because of the saving in frictional losses. Pipes that are too large are an objection because the air is constantly cooling at a rapid rate. Cold winds cool exposed walls and registers placed in the floors of rooms thus cooled conduct cool air to the top surfaces of the hot-air chamber, thereby cooling it so the heating of the entire house is affected. The remedy is to close the dampers, and registers as well, in some rooms, and also cover the registers with heavy cloth. The furnace will work well on account of the increased air pressure, and in a few hours it may be possible to open the registers and warm the rooms which for a time were cut off. If windows are opened in any furnace-heated room, at night for example, the damper in the hot-air pipe in the cellar, as well as the register in the room, should be closed, and the register covered with a heavy cloth to prevent cold air from cooling the top of the hot-air chamber.

The Cost of Operation

The cost of operation of a hot-air furnace is greatly increased by admitting outside air into the cold box. If air is recirculated we can depend upon getting from 65 to 75 per cent. of the hot air from the furnace into the rooms. If, on the contrary, the air is not recirculated, but is all taken from the outside, then the best we can do is to look for about 60 per cent. efficiency, and this often drops to as low as 40 per cent. Here again arises a difficulty. The recirculated air is not much lower in temperature than the warmed room air, so this means a loss in velocity of the air current. A direct connection to the outside induces a flow of air. The writer has solved this trouble in a number of installations by placing return ducts in the outside walls to the attic. The ducts run close to the windows, and in each room on a level with the floor at the side of, or under, the window is placed a register connecting to the duct. Behind each register is a thin plate at an angle to prevent air from an upper floor from getting into a room below and to keep it in the duct. Within these registers are placed light frames containing two sheets of cheese cloth to clean the air from dust, and one at least of these cloths should be washed each week. In the attic a register is placed in the floor at the upper end of each duct and air cleaners are placed in these boxes also.

Objections to Floor Registers

The worst possible place for registers is in the floor. Air drops to the floor when cooled and every floor has a thin layer of cold air, much of which goes down the registers into the top of the hot-air chamber, with damaging effect. Registers should be placed in the walls and the best location is on line with the picture molding near the ceiling. The warm air coming into the room rises to the ceiling and spreads over the whole room. It falls rapidly as it nears the windows, and if there is a cold air inlet at the level of the floor under the window the entering cold air and the cooled furnace air will drop to the cellar without spreading over the floor. An objection, not as serious as it first appears, to placing registers in the walls close to the ceiling, is that the walls will become discolored because the air is not clean. This objection is greatly lessened by using a vacuum cleaner; a broom or rag making the wall unsightly. If registers are not placed in this location, and most people object to them there, they should be placed in the wall slightly above the floor. This tends to prevent the entrance of cooled air and the pipe is utilized to its greatest capacity in supplying warmed air. The return of cooled air mixed with the entering cold air from the windows does not injure the health of those living in the house provided a larger part of the cold air supply comes from the attic.

Cannot Place Registers Near Windows

A hot-air furnace pipe cannot be placed in an outside wall of a house, and work properly, therefore we cannot place the registers close to the windows, as with hot water or steam heating plants. To prevent the entering of cold air from interfering with the working of hot-air pipes placed as far as possible from windows it is necessary to have the cold-air duct under the window to promote a flow of warm air from the register towards the window, the coldest part of a room. Your correspondent does not clearly understand that a steam or hot water radiator heats a room by radiated heat. A hot-air furnace, on the contrary, heats by convection, that is, by the remainder of the heat in a given volume after the heated air has traveled some distance giving up heat at every point in its path. There is a loss by convection all the way, the final loss being the loss of heat to the room,

and this final giving up of its heat is called heating the room. The air in the pipes is heated by radiation, the air in the room by convection. A hot water or steam radiator heats close by objects by radiation and the corners of the room by convection, that is, by the remainder of the heat left after every square inch of surface in the room has taken all it can absorb. This effect of convection explains why air pipes placed in cold walls are wasted, the proper place being in interior partitions where there is no exposure.

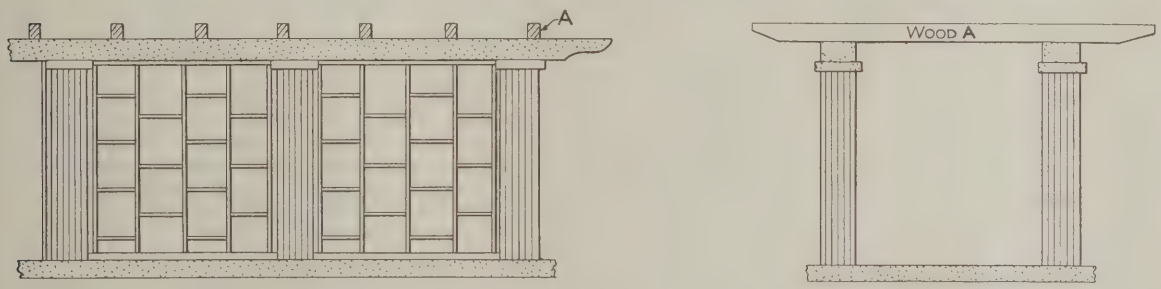
The cold air return pipes from the attic and the rooms and halls should enter a box in the basement, from which a pipe should lead to the lower part of the hot-air chamber. This pipe should have an area at least equal to the sum of the areas of the hot-air pipes from the furnace. It should have a length of not less than 3 ft., and should be clean inside. In the end of this pipe, as far as possible from the furnace, place an electric fan. On days when the wind is blowing start the fan and then the small difference in temperature between the cold and warmed air will not matter; the fan will circulate the air. It is an excellent plan to let the fan run every morning for an hour or so, and in this way warmed air will be forced into the rooms and the cooled air will be drawn into the basement and warmed, for when the fan pushes air through the hot-air chamber it of course pulls air from the cold-air feeders. In every house wall there are so many crevices through to the outside and there are so many openings in every roof that there is no necessity for a cold-air box from the outside with properly arranged cold-air feeders from each room and from the attic. The writer is strongly opposed to taking air from a basement, and believes this pernicious habit accounts for the dust usually present in rooms heated by hot-air furnaces. In every hot-air furnace, near the top of the chamber, should be a pan about 3 or 4 in. deep, with an area equal to the combined areas of the hot-air flues. This pan should be fed automatically with water by means of a ball cock to supply water for evaporating into the air to maintain a proper humidity in the house. Such a pan will so improve conditions that the rooms will be warm and pleasant even when the temperature as indicated by a thermometer is around 60 deg. Fahr.

Designs Wanted of Carpenters' Tool Chest

From C. R. W., Terre Haute, Ind.—I have noticed in various issues of the paper drawings relating to articles of furniture which seem to be well outlined. I am taking a course in manual training in the high school and wish to construct a tool chest of tolerably good size, and would like to have some of the practical readers, more especially the carpenters and cabinet makers send for publication a description of the tool chest which they use, as the subject is one which may be of interest to many other readers of the paper besides myself.

Design for Grape Arbor

From P. B. D., Clinton County, N. Y.—Answering the request of "W. M. L.," Orange, N. J., I am sending sketches of a grape arbor which may be made of concrete with the exception of the top stringers and the lattice work. All the concrete work may be done in rustic with round polished stones. The columns are round and fluted but they may be done in brick if desired. If fluted, the correspondent should use two sheets of 2½-in corrugated iron for the "forms." They should be riveted with nails driven from the inside and well bent. When taken off the nails need only be filed and broken. The columns are made standing in position. The plates are made in position by the use of "forms." The lattice work is 2 in. thick and all woodwork is painted white.



Side and End Elevations for Grape Arbor—Contributed by "P. B. D."

Two Systems of Handrailing Contrasted

From C. F. Stark, Brooklyn, N. Y.—The article bearing the above title by Morris Williams, which appeared in the issue of THE BUILDING AGE for December does not seem to me to treat the Tangent System fairly. There, for the first time, a limit is imposed, which in future is to restrict all wreaths of the system to the center of the plank. The falling line method there shown, and regarded as another system, is however, permitted to find full liberty in planks of unlimited thickness. With all due deference to both Morris Williams and the author of the latter method, I regret that I am unable to share their view when they regard this method as possessing the individuality necessary to constitute it a system, and especially do I confess my inability to view it as in contradistinction to the Tangent System. I shall point out the reasons which oppose my taking this view, and they will show that both methods are rightly to be included in the Tangent System.

It may be a general feature of the Tangent Systen for a wreath to follow the center of the plank, but no one knows better than the writer of the above article that it does not always do so. The use of

falling molds, and sometimes the mere judgment of the mechanic, is sufficient to evade this restriction. On the other hand, if we consider the "falling line method," though it may not be a general feature, it is quite possible that the demands of the stair, taken in conjunction with the discretionary drawing of the tangent shall require the wreath by this method to follow the center of the plank. This feature then can be possessed in common by a wreath formed upon either method, or it can be absent in both. It therefore seems wrong to consider it as the distinguishing feature of either.

What appears to be the essential distinguishing feature of the Tangent System, as implied in the title, is that tangents are used to determine the mold, bevels and joints.

What becomes of the falling line method if the use of tangents to this end be prohibited? Only the falling line remains.

In regard to this latter method it is important to recognize that between the drawing of the falling line and the drawing of the discretionary tangent. everything pertaining to the problem is indeterminate. An indefinite number of forms may satisfy the face molds, also each of the bevels and the direction of the guide lines may vary indefinitely.

Immediately, however, this tangent is drawn in the elevation all is changed. Now only one mold can satisfy, every bevel is determinate, and the guide lines can have only one direction. In this complex method, as in the simpler methods of the Tangent System, the instant we decide on the elevation of the tangents, all variation in the solution of the problem is excluded.

Does not this seem to show that the falling line answers the same purpose in the elevation as the quadrant or segment does in the plan? Both must be regarded as controlling factors in a similar sense. Together they more definitely state the problem which the tangents are required to solve.

Finally, I find myself surprised at the remarkable ingenuity of any author who can take the fundamental principles of the Tangent System as his basis for evolving a more perfect method and who afterward considers his success as a proof of that system's limitations.

How to Shingle a Roof

From R. O., New Canaan, Conn.—In the January issue of THE BUILDING AGE there appeared an article entitled "How to Shingle a Roof," and in it were statements with which I do not quite agree in all respects. While the author of the article in question is right and safe to follow in the main, yet when he says the nails should be placed not less than 1 in. from the edge and that the joint should not break less than 1 in. also, I do not agree with him.

I think he will find that this would often bring the nail directly *under* the break, causing a leak in a short time by rusting the nail. If he will place the nail ½ in. from the edge this will be avoided.

From R. H. C., Windsor, N. S.—I have been a reader of THE BUILDING AGE for several years and find it a great help to me. As a general thing the methods described in the Correspondence Department are in accord with my own notions, but I beg to differ with the author of the article in the January issue telling "How to Shingle a Roof." In the most essential part he is wrong; that is, in nailing 1 in. from the edge and breaking joints directly over the nail, which not only rusts the nails but rots the wood.

My suggestion is to nail ⅜ in. from the edge and break joints 1¼ in. from the edge. Do not hit the nail after it is down. I have proved this to be the proper way to nail by comparing the durability of roofs with those done by other systems of nailing and using the same kind of shingles. I know of roofs which are in fairly good condition to-day which were shingled 27 years ago, making use of common wire nails.

Dry Rot in Factory Timbers

From W. H. B., Janesville, Wis.—In a recent issue of THE BUILDING AGE, under the above heading, it was stated that extensive experiments are being made to determine the cause of fungi. From my earliest childhood to early manhood I was in close touch with the manufacture of hardwood lumber, and have since by the nature of my business been required closely to observe the various woods used in building construction. I early became convinced that the development of fungi depended largely on the condition of the timber when taken from the stump, or rather the time of year in which the trees were cut. To particularize, lumber is more liable to fungi when timber is cut during the flow of sap (from the earliest budding until mid-summer), but most liable when cut in the full flow or leafing time.

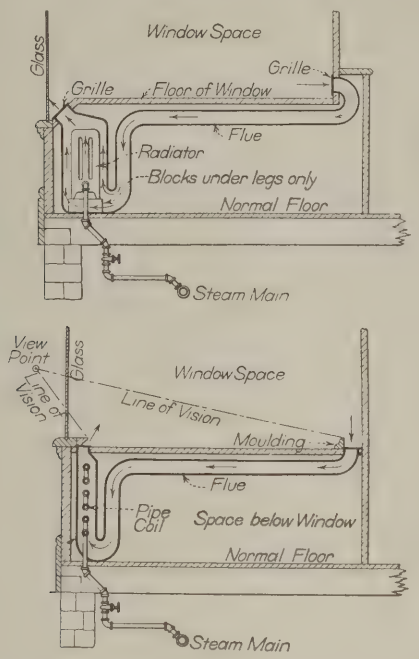
By observation I am convinced that timber will make harder and more durable lumber if felled in mid-summer, or just after the growth has ceased, and care is taken not to let the lumber heat in the pile and form fungi.

Preventing Condensation on Show Windows

From Experience, Chicago, Ill.—So much has been said in the trade press about the annoyance arising from condensation on show windows and the various remedies therefor that the subject would seem to have been pretty well exhausted, but I venture to offer a few remarks that may embody a useful hint or two. The trouble so frequently experienced is very often due to the drying out of the plaster and masonry, when the building is new. The writer knows of one case where a building (which had the sash and sash hardware installed at an early date in order to permit the use of temporary heat), had to have all the hardware replaced, owing to the inroads of corrosion made by the excessive moisture in the air, as the water was driven out of the plaster by the heat.

The cause of moisture collecting on the window glass, or, in fact, on any cold surface, in a building after it has been thoroughly dried out, is the absorption of moisture by the air, and its condensa-

tion, under certain conditions. The exact amount of moisture which a cubic foot of air will carry at any given temperature has been exactly determined, and it has been found to increase with great rapidity as the temperature rises. If the moisture in the air at any given temperature exceeds the



Preventing Condensation on Show Windows—Sectional Views Showing Window with Radiator and Also with Pipe Coil

moisture-carrying capacity of the air at that temperature, the excess moisture is precipitated in the form of water on adjacent surfaces. The reason why cold surfaces are most subject to this precipitating or "sweating" is apparent in the following:

The average amount of moisture carried by outside air at any temperature varies between 50 and 80 per cent. of the amount it could carry before reaching the limit of its capacity (which limit is termed the "saturation" or "dew" point). Note, however, that this average humidity of 50 to 80 per cent. applies to air at any temperature, and is based on the "saturation point" of the air at that temperature only.

If we raise the temperature, the moisture carrying capacity is also raised. Air containing a normal amount of moisture will, if reduced in temperature, approach the saturation point, and, if sufficiently cooled, will precipitate the excess moisture on the cooling surface.

Knowing these facts, it is easy to understand how the sweating and frosting of windows often results.

Of course, there are many causes tending to raise the humidity or moisture in the air. The evaporation of moisture from the body, the vapor in the breath, the steam of the tea kettle, the hot water used in washing, the constant drying out of any and all moist materials which give up their moisture to the surrounding air and (in recently erected buildings) the drying out of damp plaster, all may cause window steaming.

As a general rule the atmosphere of a room in cold weather does not contain sufficient moisture.

Having determined the cause let us look for a remedy.

The first and simplest method is to shut the window off entirely from the store, and, by means of top and bottom registers opening into the outside air, maintaining, as far as possible, equal temperature on both sides of the glass. This method has disadvantages, as the openings admit dust as well as air, may leak when it rains, and the goods displayed may be affected by the varying outside temperatures. Moreover, this method is not suitable to other windows not in stores where the same trouble is experienced.

The second method is to blow air against the inner surface of the glass by means of a small fan, so as to keep up a constant circulation. This is a crude and more or less expensive method, as the fan generally does not do effective work except within limits of three or four feet.

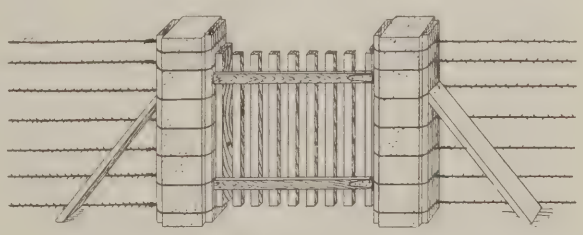
The third and most efficient method is by the use of heat, from a radiator set directly under the window, and covered by a long and narrow shield, so as to throw the heated air up beside the glass on the inside of the window, all as shown in the sketch.

This same method is applied to skylights by the use of skylight coils of steam pipe, a scheme with which almost every one is familiar.

Fastening a Gate to Concrete Posts

From J. F. H., Indianapolis, Ind.—A rather ingenious method of fastening a wooden gate to concrete fence posts is in use on a farm near Fort Wayne, and I am sending herewith a sketch of it which may possibly interest some readers of the paper. The posts are perfectly plain and are straight from top to bottom without the slightest taper, measuring 10 x 10 in. in cross-section.

To attach the gate jambs and the brace pieces, the workman placed a 2 x 8-in. plank on two sides of each post as shown in the sketch. The braces were fitted next and spiked to the outermost planks, while the gate was hung to the inner planks. The



Fastening a Gate to Concrete Posts

fence wires were then twisted tightly around the concrete posts and planks, thus binding all firmly together as shown in the sketch.

Details Wanted of Practical Ash Chutes

From H. V., Paterson, N. J.—Will some of the readers of the Correspondence Department kindly send for publication details of practical ash chutes extending from first floor kitchen range to cellar?

Mount Vernon, N. Y., is to have a new post-office estimated to cost $100,000.

Details of Wall Board Paneling

Various Suggestions and Directions for Designing Wall Board Interiors—A Practical Example

By Joseph A. Poesl

WHEN wall board interiors are unsatisfactory from an artistic viewpoint, the reason why, in most cases, is the lack of care and judgment exercised in designing the panel arrangements. Undoubtedly builders will, therefore, be interested to learn just how they, themselves, can design paneled walls and ceilings which will not only enable them to put good interiors in their houses, but good looking ones as well.

Let it be stated at once, that in order to create the best panel designs one must believe in the panel idea. There is really no more pleasing, no more artistic, no more beautiful means of treating an interior than paneling. The skeptic has only to glance about him to be convinced. Let him note the panel decorations of the most expensive residences, of the costliest public buildings, of the best hotels. Why, away back before the Christian era, when architecture had reached its highest state of perfection, those wise Greeks favored this method of interior decoration.

No matter how large the house to be decorated, it is easy to work out a suitable and entirely different scheme of paneling for every room. The possibilities in this direction are unlimited. There is nothing monotonous about it, provided it is carried out properly.

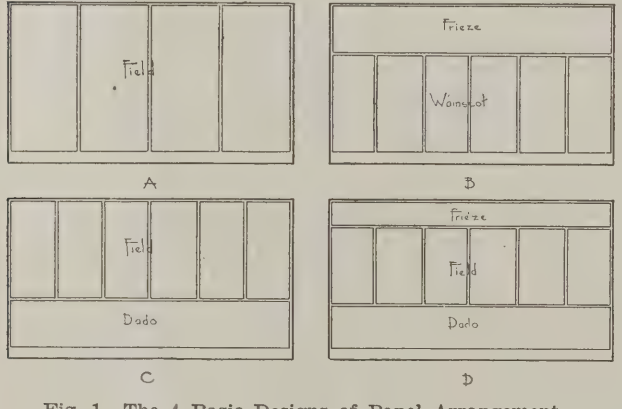


Fig. 1—The 4 Basic Designs of Panel Arrangement

Although the variety of panel arrangements possible with the many different sized panels, in which wall board is made, are endless, there are actually but four basic designs from which others are derived. These are shown in Fig. 1 of the accompanying illustrations. It might be well to note how the different wall divisions are designated.

The panel sizes just referred to are 32, 36 and 48 in. widths, and 4 to 16 ft. lengths. The 32's and 48's are adapted to studs 16 in. on centers, and the 48's are also adapted to those 24 in. on centers. The 36's are adapted to only those 18 in. on centers. In all, there are thirty-nine different sizes, which, it will be seen, afford numberless combinations and arrangements.

Seemingly, the proportions of a room are affected according to the arrangement of the panels. In Fig. 1, design *A*, we have an arrangement which has a tendency to increase the height; design *D* has an entirely opposite effect, while *B* and *C* are more or less neutral.

Furthermore, some designs are more appropriate to certain rooms than others. Referring again to Fig. 1, *A* is most suitable for living rooms, halls, reception rooms, bed rooms, stores and offices; *D* for dining rooms, libraries, dens, offices, stores and theaters, and *B* for kitchens, bath rooms, dining rooms and lunch rooms. To stores, offices, school rooms and any room with a disproportionately high ceiling design *D* is best adapted. Don't forget these designs are basic and that by the simple addition of extra paneling strips, many variations are easily produced; so that no two rooms need be identical.

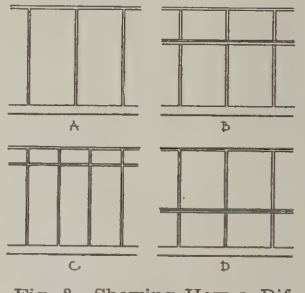


Fig. 2—Showing How a Different Arrangement Can Be Carried Out in Each Room

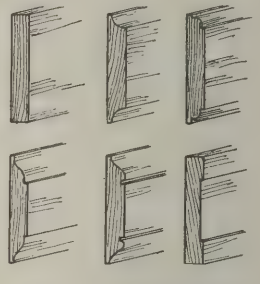


Fig. 4—Various Styles of Decorative Strips

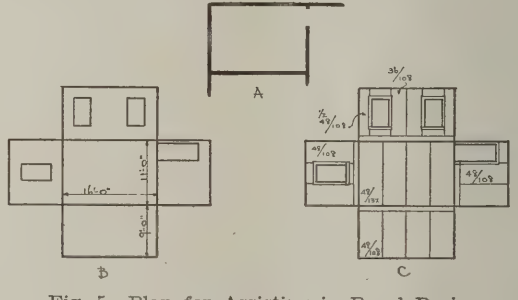


Fig. 5—Plan for Assisting in Panel Design

While it is true that the majority of building men are well acquainted with wall board, there are those who are not. Recently one of the latter landed contract for a small frame house for which wallboard was specified. He examined the plans, learn-

ing that the lower rooms would be 9 ft. high, the upper 8. After a little figuring, an order for the necessary wall board, including a lot of 9 ft. and 8 ft. lengths, was placed with his lumber man.

As is frequently the case, the wall board salesman got wind of the job and went out to see the builder, hoping to be able to give him a few pointers that might aid him to bring about a first-class job. In the course of their conversation he was surprised to discover that only one panel design was to be followed throughout. That is, all panels would extend in an unbroken length from the floor to the ceiling in all rooms.

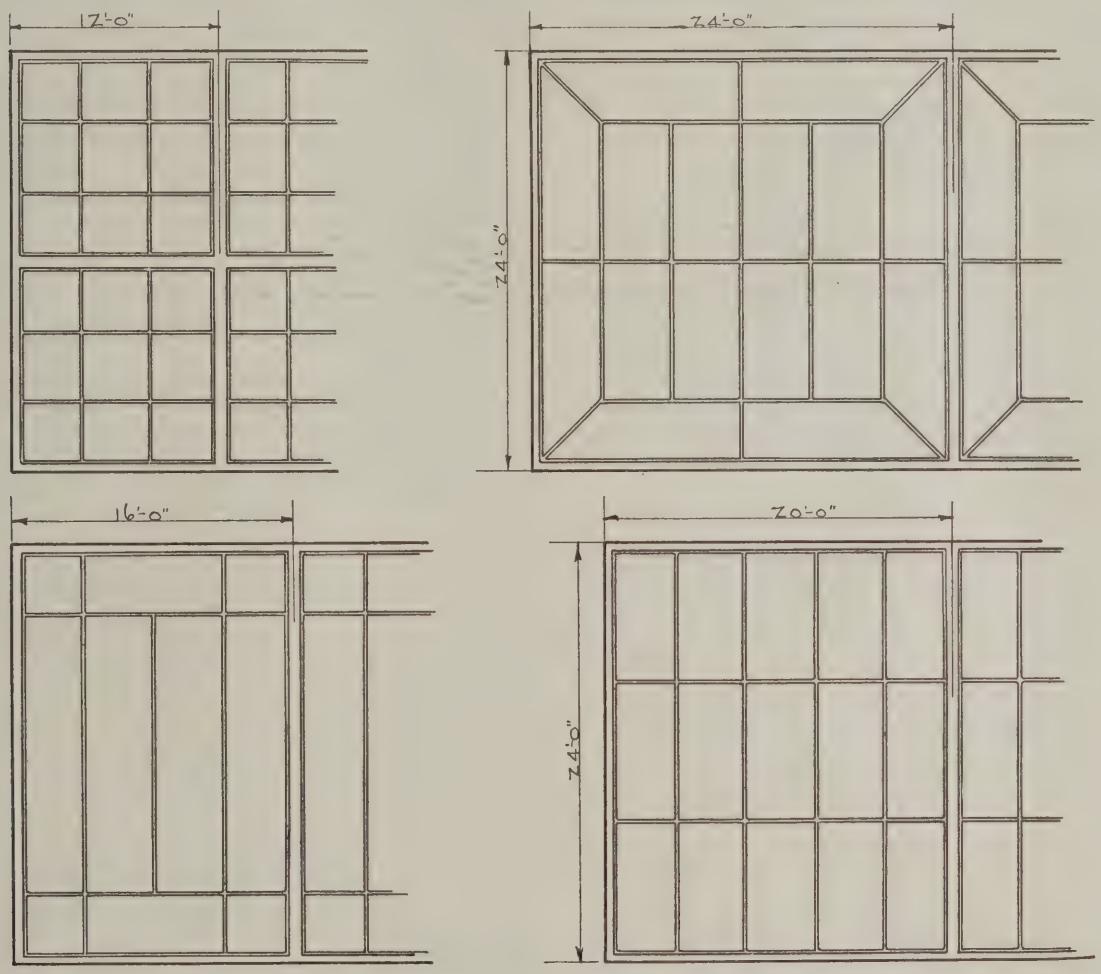
Imagine what an uninteresting and monotonous interior that would give the house! Realizing this, the salesman offered panel arrangement suggestions, but was only thanked and informed that, as the board had already been ordered no changes could be made. Here is an instance of lack of forethought and knowledge. There is no doubt that had this builder known about paneling, he would have employed a little time in planning the panel arrangements before ordering the required wall board.

The salesman accepted matters as they were and set about to solve the problem before him—the problem of making this an A No. 1 job, not only in application and decoration, but also in paneling. He knew that a satisfactory job would produce a boosting builder, a pleased owner and a lasting advertisement for wall board.

"Here," he finally said, referring to Fig. 2—a drawing he had prepared—"is a way in which you can carry out a practically different arrangement in each room; and yet use the panels you have ordered. Follow *A* in the hall and living room; put a plate rail about 32 in. from the ceiling around the dining room. In the bed rooms, place an ordinary decorative strip about 18 or 24 in. from the ceiling, as in *C*—use 32's in one and 48's in the other; and raise or lower the strip in others as desired. Place a strip about 4 ft. from the floor to form a dado in the kitchen and bath, using 48's in the former and 32's in the latter, as in *D*. Very simple isn't it?"

"However," he went on, "be sure to place headers back of the board, where these extra cross strips are placed, for nailing the board and strips tight together, one to the other."

Now, this is a pretty good stunt. The simplicity of it makes it easy for any builder to have tastefully and neatly paneled rooms in his houses.



Details of Wall Board Paneling—Fig. 3—Showing Treatment of Several Ceilings

It is, perhaps, worth while mentioning here, by way of suggestion, to be careful in fitting panels into the wall spaces so that a balanced effect will result. As many panels of one width as possible should be used in a single room; for it would not be well to have narrow panels on one or two of the walls and wide ones on the rest.

Nothing has as yet been said about ceilings, because nothing much needs to be said about them. Being nearly always square or rectangular in shape, they are easily taken care of. The usual treatment is to have them harmonize with the walls. In other words, let the wall design govern that of the ceiling. Of course, large ceilings are more difficult to treat,

due to the fact that they are often the governing factor, because shelves, hangings and the like hide most of the wall surface. The simplest, and perhaps best way of paneling them is by dividing them into sections by false beams and then working out similar arrangements for each section, thus virtually having panels within panels. Fig. 3 shows several ceilings treated in this way which might be of interest.

The decorative strips used for covering the intersections of the panels may be very simple or elaborate. In Fig. 4 a number of those most common are shown. It is best to have them rather wide than narrow. Thus, a room is given a substantial appearance which is much more pleasing than obtained with those thin, narrow, strips sometimes resorted to for cheapness' sake.

The example presented herewith will assist builders to design panel arrangements in a simple, quick and easy way. From the portion of a floor plan, *A*, Fig. 5, make a ruled drawing, to scale, if possible, or in fairly good proportion, drawing in all of the openings as in *B*.

With this drawing before you, select a panel design that is best suited to the size, shape and character of the room. On the ceiling let the panels run in the same direction as the joists extend. Fit the panels into the various wall spaces as uniformly as possible. It is also well to see that the edges of the panels come on studs and joists; otherwise, additional framing members are necessary to provide the required nailing surface for all four edges of every panel.

It will be assumed that design *A*, Fig. 1, is satisfactory for the room. Sketch in the panel arrangement, indicating the sizes of the panels as shown in *C*, Fig. 5. This gives, at once, the number of panels needed of each size and serves as a guide in applying the board.

Follow this method for each room, and, as already suggested, be careful to avoid monotony by thoughtful planning; for after all, good paneling is only a matter of good taste and judgment. Every first rate builder possesses these faculties, and consequently there is no reason why every wall board job should not be well paneled.

San Francisco Building Material Market

Our correspondent, writing under date of Jan. 4, says: Following a quiet year, the current movement of building materials has been further curtailed by seasonable weather conditions, but December was rather remarkable for the rapid increase in the number of plans offered for figures, and there is now enough work of importance in sight to cause an active movement in all lines as soon as outside work can be resumed. The prospects include several downtown office buildings and a number of factories in this city, while the enlargement of many chemical works and other manufacturing plants in the industrial district along the east shore of San Francisco Bay is beginning to call for more workmen's dwellings in that vicinity. It was feared that the end of the exposition would find San Francisco and nearby towns overbuilt, but, with the possible exception of high-class hotels, there is even less surplus building space than there was a year ago.

Prices of most materials are advancing. The high price of metal goods is now an old story and has been pretty well discounted, but the rapid advance of steel products, including structural shapes, reinforcing material of all kinds, metal lath, nails, etc., is causing builders some apprehension, especially as supplies of such goods are in danger of running short. The belief at first expressed that these extreme prices would retard building seems not to have been well founded.

The last item to advance has been lumber, which had been selling practically below cost of production for over a year past. While the mills are still greatly hampered by lack of foreign transportation, there is a large demand for Pacific coast lumber in Europe, and railroads and other large domestic buyers, in addition to the retailers all through the Middle West, have bought liberally during the last two months, causing quite a sharp advance at the mills. In addition, coastwise steamer rates have gone up abruptly with the renewal of demand in California, so that prices in the San Francisco district are now about normal, with an upward tendency.

In brick or cement no immediate advance is expected, as the output is ample for all requirements, and both have been pretty steadily held at remunerative prices for some two years past, cement being quoted here in carloads at $1.90 per bbl., net, without sacks. Rather large stocks of common brick have been accumulated during the last two years, and manufacturers are disposed to hold their production down to reasonable limits.

Static Load Tests for Concrete Beams

The first of a series of concrete investigations of large-size test members has been started by the United States Bureau of Standards. The making of thirty-six concrete beams, 8 by 11 in. in cross section, and 13 ft. long, is the initial step in the work. These are to be subjected to static load tests, the beams being piled in a criblike manner and then further loaded by a platform carrying a dead weight. The deflection, etc., of the beams will be measured from time to time, and after one year's observation, a duplicate set of beams will be tested to destruction.

New Shingle Measure

The California Department of Weights and Measures recently notified all shingle dealers that in future shingles must be sold on a full-count basis. The Redwood Shingle Association has notified the authorities that it stands ready to give assistance in putting the new rule into effect. The basis formerly used on redwood shingles will be abandoned, and five bundles instead of four will now be regarded as a thousand.

Canada has established a forest products laboratory in conection with McGill University at Montreal, on the lines of the United States institution of the same sort at the University of Wisconsin.

House Moving Hints for the Builder

Past and Present Day Methods of Doing the Work Contrasted—The Proper Equipment

By E. W. La Plant*

EVERY carpenter-contractor and builder is called upon at times to move a building from one location to another so that a new structure may be erected on the old site. Five or six years ago contractors would wreck the building, unless they could find a house-mover to handle the job. In many cases the man found was so independent he would almost have to be bribed to come and figure on it. Nine out of ten of these men only had a wheelbarrow load of old rollers and pulleys and were not equipped to properly handle the job. As a rule they failed in their efforts, and in most cases they would delay the erection of the new building which was both annoying and expensive.

That is why building contractors of to-day are becoming house-moving contractors. With the modern methods they can complete the moving jobs in short order. But a few years ago the carpenter-contractor disliked to tackle house-moving because of the hard, uncertain job due to poor equipment. Nowadays a man cannot really afford to wreck a building because the price of lumber and the cost of erection has increased at a tremendous pace in the past ten years.

Take a city man who has an old-fashioned house, but who wishes a modern home. His logical proceeding would be to buy a reasonable priced lot, move the old house on it and then erect his modern home on the original site. He will be better satisfied that way than to build on and enlarge his old home. Besides, he saves money.

Out on the farm it's the same way. The farmer

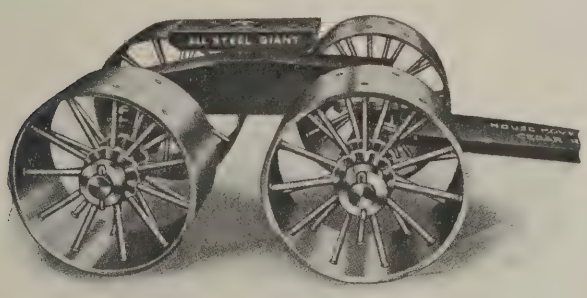


Fig. 1—One of the House Moving Trucks

sends his children to college; they get new ideas about homes and soon the whole family wish a new, modern home. Years ago on the farm the house was moved, using logs as rollers, into the back yard and utilized for a milk shed—to-day, our friend-farmer moves the house to another section of his farm for his hired help, or, if he is only three or four miles from town he will buy a cheap lot, move the house on it, fix it up and then rent or sell it.

This gives the house-moving contractor three jobs. First, the moving; second, the repair work



Fig. 2—A 12-Room House Loaded on the 3-Point Method

on the old house, and, third, erecting the new home.

Three house-moving trucks, one of which is shown in Fig. 1, are generally used and are placed under the building as in Fig. 4. One truck is placed in the center at the front, and one at each rear corner. Note that the rear trucks are brought in about one-third the length of the building. This is to divide the load equally. In this particular case the rear trucks were brought in the full one-third because the rear end was the heavier, but in placing the trucks the builder must use his own judgment as to their position.

After the house has been jacked up, the running timbers are run in and held up by jacks at each end, then the cross sills are placed at the proper intervals to carry the overhang of the front corners. Before releasing the jacks and allowing the weight of the house to rest upon the timbers, place a 1-in. board between the front cross sills and house sill at the outer edges, then when the weight is let down the cross sills spring instead of the house. Do the same at the rear end of the running sills also.

Fig. 4 shows how one may bridge across at the rear of the house, and carry the building on three points when the running sills are too short. Many houses of the old style are L-shaped, and that is why I have shown this floor plan.

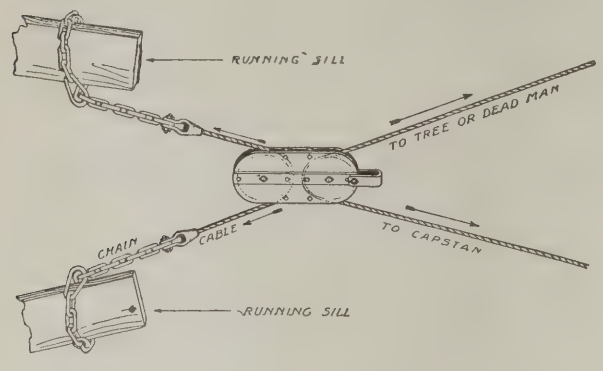
The chimney should be cut off at the floor level under the joist, then lance in the cross sill; this will carry the chimney. Be sure to remove the chimney tops down to the roof level, as chimneys are very dangerous and may topple off when you least expect.

This is the first of a series of articles by Mr. La Plant. Any one wishing information on moving or loading buildings should address him in care of the Editor, and the questions will be answered free of charge. This also includes advice on shoring store fronts and raising. The questions and answers will be published in the correspondence department of the paper.—Editor The Building Age.

*President La Plant-Choate Mfg. Co.

The method of hitching used to get an equal pull from each running timber is shown in Fig. 3. This point is important and should be watched carefully throughout the progress of the work.

The house in Fig. 2, loaded on three trucks, was raised and moved two miles in four days by four men and a team. The house was in good shape,



House Moving Hints for the Builder—Fig. 3—Method of Hitching to Running Timbers When Pulling Buildings

being only six years old and too good to wreck. The owner received more than $1,000 for this building. If he had wrecked it he wouldn't have been able to get over $300 for the lumber. This example points out clearly how the owner of the building saves money and really earns money by the moving method. Then also the builder should consider the extra profits on each job.

Fig. 2 shows the house at right angles to the new foundation. You can run the building right in on the foundation and square it within a fraction of an inch. When the foundation is in and the house is fixed up it will look as good as new.

Three-point loading is the easiest and best way in house moving. Using the three-point method one may carry any building a short or long distance safely without rack or injury.

Production of Sand-Lime Brick

Some very interesting information regarding the production of sand lime brick is contained in a Bulletin recently issued by the U. S. Geological Survey and written by Jefferson Middleton. According to this authority the condition of the industry in the United States in 1914 was on the whole rather unsatisfactory to the manufacturers, though in some States, more particularly Florida and Indiana, considerable progress was made. The number of active operators reporting increased as compared with 1913 and the value of output in 1914 was $1,058,512 which was a decrease of 14½ per cent as compared with 1913, and a decrease of 11.8 per cent as compared with 1912; but it was an increase of 18 per cent as compared with 1911.

Nine of the twenty-three States reporting a marketed product in 1914 showed an increase and fourteen showed a decrease. The increases and decreases were confined to no one section of the country. The following table shows the production of sand lime brick in the United States from 1903 to 1914 inclusive.

Year	Number of Active Firms Reporting	Value of Product
1903	16	$155,040
1904	57	463,128
1905	84	972,064
1906	87	1,170,005
1907	94	1,225,769
1908	87	1,029,699
1909	74	1,150,580
1910	76	1,169,153
1911	66	897,664
1912	71	1,200,223
1913	68	1,238,325
1914	62	1,058,512

The average price per 1000 for common sand lime brick was $5.99 in 1914, as compared with $6.27 in 1913, $6.46 in 1912, and $6.09 in 1911. For front brick the average price was $9.08 in 1914, $10.61 in 1913, $10.41 in 1912, and $9.53 in 1911.

In 1914 common brick represented 93.38 per cent of the value of all products and front and fancy brick 6.62 per cent. In 1913 common brick represented 90.32 per cent of the value of all products and front and fancy brick 9.68 per cent.

Cleaning Sandstone and Limestone

If a front of sand or limestone is stained with dirt and soot, it can be cleaned by a strong solution of caustic soda, which is applied with a long handled fiber brush. After being on for about 20 minutes, the stone is rinsed with clean water, by means of a hose for preference, or failing that, with a large sponge. If the front is water stained, use a rubbing brick, pumice stone, or standstone of fine grain with water in which oxalic acid has been dissolved—at the rate of one pound of acid to pail of water. This second method also requires a sponging off with cold water.

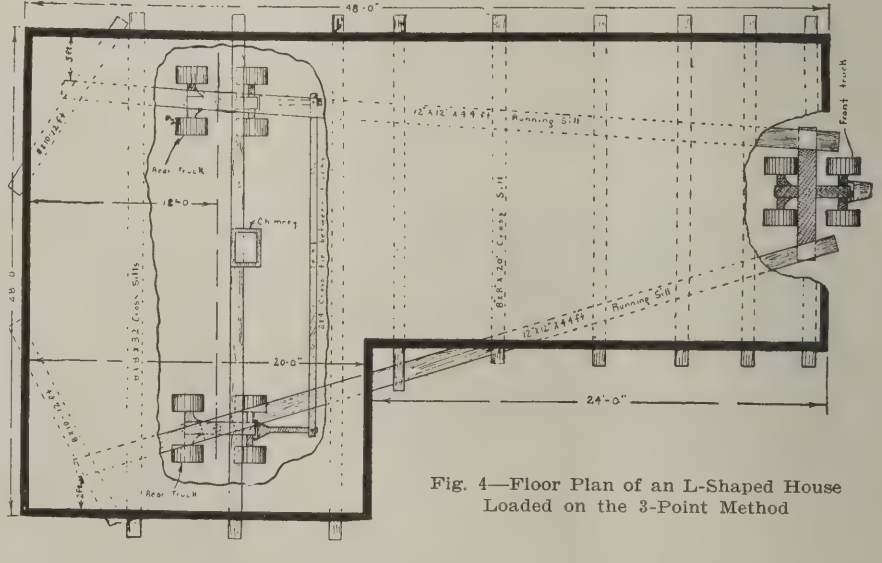


Fig. 4—Floor Plan of an L-Shaped House Loaded on the 3-Point Method

There is a thoroughfare in Buffalo, which, for its entire length is restricted to single dwellings of the bungalow type, no two being alike. It is known as Fordham Drive in Nye Park.

Building the Stucco-Coated House

Some Reasons Why This Form of Construction Should Appeal to the Present-Day Home Builder

By Warfield Webb

IN building the home we have many important matters to keep in mind, as there is a vast difference between a "home"and a "house." The latter is a living abode in many cases, but the former is to be the ideal, and the one place that should be so erected. The important consideration then is to make the home attractive from the outside. More people see the exterior of the home than the interior, and a good appearance should be planned out well in advance.

There should be a study made of the location—the setting—the size, the style and the material for the exterior. The latter becomes vital, because upon its selection must depend the final success of the undertaking. The exterior should comprise art, durability, good taste, and be capable of making the ideal that we have set up for ourselves. Now there are many styles of exterior material. These comprise a variety of color effects, and when properly put in place bring into being the most exacting requirements of the owner.

If we build we should keep before us the nature of the building, its location, and try to make the material harmonize with the surroundings. Do we fully value the effect that this brings about and the lack of which does so much to depreciate the home from an artistic point? There should be in mind the idea of erecting a home for its beauty, and this becomes, not only to ourselves a source of gratification, but enhances the value of the structure, and magnifies its true value.

There is, however, a vast difference between the home with true art in the exterior, and one that



The Broad Face of a Stucco-Coated House Well Broken by a Multiplicity of Windows

partakes of the cumbersome type, the sought-after-effects having been stifled in the effort to create something different. The true beauty lies in simplicity, and this is easily attained where the effort is made in earnest. Simplicity in design is the most striking evidence of real merit. The insignia of beauty lies in its greater conception as applied to the home.

To-day we see many homes erected with a stucco exterior. It might be added that some of these, and a goodly percentage, are lacking in the very essential for which we were originally striving—the attractive exterior. This is due to several things. In the first place the style of the house is such as to make the exterior inharmonious. The lines and angles are out of proportion and the setting lacking in important respects. The exterior itself is devoid of proper color effect, and the material, sometimes of poor quality and improperly applied, gives the structure a hideous appearance.



Another Example of Stucco Finish Relieved by the Block Effect at the Corners

To make the stucco exterior home of real attractiveness, and to make it likewise durable, we cannot afford to use inferior material. The logic of this is so plain as to need no comment. Then, with good material in the hands of inferior or careless workmen, there will be a like unsatisfactory job, and the house will be to the owner what it is to the beholder—a miserable makeshift. It might be added that with the use of the best stucco the effects possible are wonderful, and with the use of the contrary kind there is nothing that will so mar its value and its outward appearance.

Some contractors, and they are not alone the guilty parties in such cases, resort to inferior material, with the addition of inferior workmanship, and in this way make the home anything but attractive and a just cause for complaint. To make stucco durable, attractive and combine with these attributes the effects that are sought by the home builder, the best material only should be applied to the walls. In no case should lime become a part of the stucco, as lime kills the life of the material, as well as its appearance.

It is an erroneous idea that some home builders have that stucco can only be made in the natural

cement color, or confined to gray, of several shades, or white. The inferior grades, it must be admitted, are confined to a limited number of colors, and even then to such shades as will not long retain their original hue. Instances of this are common, and further there are to be seen vast cracks, even loose sections and sometimes large sections falling off.

Good Materials Should Be Used

These defects are laid to the foundation, or to the lath, by the man who has applied the stucco many times, and he seeks to hide his own inferior material or lack of conscientious labor. Good stucco, that which contains no lime at all, only a combination of Portland cement, pure sand or silica and crushed stone, marble, quartz, granite, or whatever aggregate may be used as the finish, when placed upon a foundation of either wood or metal lath or other durable surface will insure the very best possible results to the home builder. It will do more—it will be possible with a material of this kind to make the color effects, not only of many hues, but to harmonize with any desired effect.

The Color Scheme

The colors are of the most delicate hues, and the shades will last as long as the house itself. But there must be care exercised in the building of the home to bring about this result. The entire structure must be built with honesty and good materials should be used in all important sections. If the foundation is weak in any part, we must expect the best quality of stucco to show cracks when the house settles. Even brick and stone will crack under such strains. The fault in this case is due to inferior workmanship.

The lath should preferably be metal, as it has proven its greater service for such work. Where the best Portland cement stucco is used, however, wood lath, when properly applied, will give entire satisfaction to the owner. One thing should be kept well in mind, and this is the security of the roof. If there are any weaknesses in this way, there will be some serious danger of the best stucco being damaged. The base, water tables, sills, door and window frames should be set with care and the other exterior sections of the house in no essential part slighted. The results of this carelessness will act as a loophole and will permit the stucco to show greater or less damage.

Three Coats Should Be Applied

When properly applied stucco should be put on in three distinct coats. The first, or scratch coat, with as much care as the second and final or "dash coat." The second coat serves as a greater foundation and as a surface for the outer finish. This third coat can be either of "rough cast" or "float," according to the nature of the application, one being less uneven in texture than the other. There should be ample time allowed between the application of the several surfaces to permit them to dry out, and become hardened before applying the successive coat.

To make the color effects possible one has to purchase only the best Portland cement stucco, the color being already mixed in, and only needing the addition of water to make it workable. Sometimes marble, granite, or quartz chips or gravel are used to make a more attractive exterior possible. Some of these, when mixed and applied with intelligence, permit of an acid washing, that brings out most wonderful effects and distinguishes the house for its signal beauty.

Good stucco can be applied to wood, metal, brick or tile surface. In the remodeling of homes it has been found an ideal material. It is so easily applied and the cost so low, comparatively, that it has become one of the very popular materials for home building. It is durable, lasting for years intact, and is accepted by the insurance fire underwriters as a fire resisting material even when applied to frame houses.

Building for Durability

It might be considered, at least by some, to be an inferior and cheap house material. To-day there are a large number of residences coated with the best quality of stucco. The inferior kind is only found on the cheap house. The man who builds the more costly home is insistent upon having only the best, and this costs so little more than the less desirable kind as to be only a trifling reason why it should not be adopted by the home builder. He is not building for a day or a month, but for years, and he should have not only an attractive exterior, but one that will serve him for years and always be to him a source of comfort.

Electricity in the Home

The growing popularity of electricity for a great variety of purposes in the modern home is well illustrated in the case of the residence of a Mrs. Baldwin, located about 15 miles east of Los Angeles, Cal. Here special attention has been given to the lighting effects. On the large uncovered veranda of the house about twenty-five single lights of unusual design attract the attention of the visitor. In one of the rooms a particularly striking placement of electric lamps reflects indirect lighting units on the light colored ceiling and displays many rare and valuable paintings to the greatest advantage.

One of the novel features of this electrified home is the fumeless, odorless kitchenette, where a fully-equipped electric range and other appliances help to solve the servant problem.

There is also an electrically equipped laundry, where electric washing machines, irons, driers and other modern apparatus are in constant service. In the basement of the building is located an electrically-driven refrigerating plant of six tons capacity. The machine produces about 400 lb. of ice each day. Adjoining the plant are the electric vacuum cleaning machines, which extend throughout the house.

Water for drinking purposes is electrically cooled and purified and distributed, while water for the entire establishment is obtained from a well in the remote section of the grounds and piped by means of an electrically-driven pump to a nearby reservoir.

The house, which is of Grecian architecture, stands in the center of a 15-acre plot under the Sierras, with a mountain growing out of the back yard. Surrounded by a clump of trees on the west side of the house is an open plunge completely furnished with lockers, showers and other conveniences.

Estimating Mill and Cabinet Work

Various Methods of Figuring Costs—The Task of the Estimator—His Zeal to Get Business



NEARLY all the mill work done by the average wood-working shop is secured by competitive bids, based on estimates of the cost of materials and the amount of labor required. The methods of ascertaining these costs depend largely on the kind of cost system used. When the system gives separate results for each department, and each job is worked completely from rough lumber to finished product, under separate order numbers for each class of items, the cost of the frames, doors, sash, trim and cabinet work can each be ascertained and used as a basis for estimating future work of the same class.

Margin of Profit

If the cost system simply records the time and material, and the same shop order number is used for the entire job, there will be very little from which to determine the cost of any particular item or set of items, to show whether they were made at a profit or loss; but the total figures will show what the margin is for the entire job. This is better than waiting for the annual inventory to show what the average has been for the entire year, but gives no results that will disclose any leaks in any particular department, that may be easily remedied if discovered and located.

Many shops figure the cost of material and labor from a schedule of prices taken from some standard price list, but they have no means of knowing what it costs to produce the goods in their own factory. The percentage added or deducted from the list price is based largely on the competition to be met in securing the work, and the volume of work already on hand.

Task of the Estimator

The task of the estimator doing the work for such firms is an easy one, says W. J. Malette in the *Wood Worker*, as it is not difficult for an experienced man to count off the list of items from the plans and specifications and tack on the schedule price. In the percentage to be added or deducted is where his judgment will have to be pitted against his competitors, as they may be using the same price list. Frequently this point is decided by the head of the firm in consultation with the estimator, and in many cases, especially in small shops, they are one and the same person. The only possible "come-back" to an estimator, with this method, is an error in the quantity taken from the plans, and even that will not appear unless the quantities furnished are carefully checked against the estimate list.

In higher-grade work there is very little chance of finding a price list that is reliable, and any firm that does that class of work usually has a cost system that can be depended upon to furnish enough data on which to base a reasonable estimate. Regular work, such as counters, shelving, partitions, etc., can usually be reduced to the cost per lineal foot, but any such method is not very accurate, as there are so many different types, sizes and grades, that vary greatly in cost of manufacture.

Basing Cost in Lineal Feet

An estimator who bases cost on lineal feet should be well acquainted with the type of work wanted and the cost of producing it in his factory, or his figures will be only guesswork, and probably pretty wild at that. Experience is the best teacher in this line, but some firms pay pretty dearly for the inexperience of those who do their estimating. The man who has worked his way up through the factory to the position of estimator is pretty sure to know what kinds of work require the most labor to produce. He will usually figure pretty high on special work—and lose the job to some other fellow who does not know the actual cost of special details and set-ups.

Recently I saw a motto which reads something like this: "Any fool can cut prices, but it takes a good man to produce a better article at less cost." This should be displayed conspicuously in every factory office. The zeal of the estimator to get business often gets the better of his judgment, then he depends on the shop management to take it out of the job some way, if possible, to save a margin of profit.

Problem for the Estimator to Solve

When the estimator for cabinet work bases his figures on the cost of producing the goods in his own shop, he has a difficult problem to solve, for he must first find just how much material will go into the finished product. This requires something besides ability to read blueprints, for the average architectural draftsman knows very little about the construction of the work he shows with his finely-drawn lines. Even when full-size details are furnished, the amount of lumber does not show, as the outlines only can be followed in construction. Boxing can often save a lot of lumber, with no loss of necessary strength or durability, but only a practical mechanic can determine how this can be done to advantage. The proportion of labor to the quantity of lumber is a fine way to determine the cost of cabinet work. This can only be determined by past

experience in the same line and class of work, and a proper cost system will furnish the exact data.

The experienced man who has worked in the shop on small cabinets, with lumber worked into small sizes, knows how much more time it takes to work up and finish 100 ft. of lumber in that way than in work where the lumber is in large pieces. Not only is there the extra cutting of lumber into small sizes, but also the working and assembling them in the cabinet room amounts to nearly as much for small pieces as large ones. Sometimes the very smallness of a special cabinet makes it more difficult to machine and assemble than if it were double or treble the size, with exactly the same number of pieces to be handled.

This fact is very easily overlooked by an estimator who has had no shop experience to guide him in determining the labor cost on this class of work. The only safe way is to refer to the records of the cost system in similar work done previously. Often something entirely different from any previous work will show up, and a price is wanted before the order can be secured; and the successful estimator is certainly not the one who gets the work at too low a figure to make a profit for his firm. He may beat the others by figuring lower, but if his factory cannot produce the goods at the price he gets for them he should be called to account for the loss.

It will not do to try to shift the responsibility for the loss to the shop management, for their business is to produce the goods as cheaply as possible and keep within the specifications, regardless of the contract price—which they probably know nothing about and are not responsible for. Of course, proper care in selection of suitable materials, economy in working, and up-to-date machinery and equipment will materially reduce the cost, but that is another chapter. The cost in the drafting room, for detailing, laying out and billing in the materials for special work should not be overlooked in the estimate, unless that expense is provided for in the percentage added for overhead expenses.

When work is scarce and hard to get at a reasonable price, the estimator is expected to figure pretty low, for no mill can afford to let experienced men go and the factory stand idle, hence work taken for the cost of production, plus overhead expense, is better than none at all. Where the management has won the confidence of the employees by fair treatment and wages in prosperous times, it is quite possible to induce them to stand a temporary cut in wages and so reduce the cost of production. This will give the management a chance to secure some orders that it would not otherwise dare to take at the price offered, and keep all hands busy, even in slack periods.

Efficiency in Modern House Painting

Surfaces to Be Painted Must Be Carefully Considered—Two General Classes—Old Surfaces

AT some time or another most of us have kidded carpenter friends about being "wood-butchers," but now along comes a man who calls himself a "Paint Doctor." Odd, isn't it?

But there is at least an interesting likeness between the physician and the painter. The former must study his patient, learn what is wrong, prescribe and treat him. And the painter, to succeed in all of his work, must consider carefully the surface he is to paint and analyze the conditions under which he is to work.

Things to Do Before Painting a Building

When called upon to paint a building this Paint Doctor thinks it is an advantage to examine it and find out the kind of lumber or paint used, says a writer in the *Carter Times*. If the old paint went wrong, he tries to find the cause, so as to guard against its occurring again. When the paint has scaled, he wants to know why. Was the fault in the paint or the wood? With a case of blistering, was wet lumber responsible, a leaky gutter, a careless painter or moisture from other sources? Was the wood primed with yellow ochre, which absorbs moisture and doesn't dry, or else throws off the finishing coats?

To get the most value out of a paint investment involves quite a comprehensive knowledge of materials, conditions and men. It means finding out the one best way to paint each house, and that amounts to the much talked of "efficiency" of to-day. No two surfaces are exactly alike, but on new work they may be conveniently divided into two general classes: In the first are dry, porous soft woods, such as white pine, poplar, white wood, cotton wood, etc. The second class consists of such lumber as presents a hard surface well filled with sap, which makes it difficult for paint to anchor itself in the pores sufficiently to avoid scaling, such as pitch pine, cypress, redwood and red cedar.

The White Pine Class of Surfaces

With the white pine class of surfaces it is desirable to get as much oil as possible into the wood and paint. The amount and the quality of the linseed oil used determine the length of satisfactory service rendered by the paint. On new lumber at least three fairly thin coats ought to be applied. To use but two requires that the paint be mixed thick to cover well, and thick paint does not carry sufficient oil to satisfy the lumber and bind the pigment to the surface as well. Too few coats, which means too little oil, on this kind of surface result in premature and rapid wearing off of the paint. In the case of gray or slate colors produced with lamp black spotting, or fading in spots, also results. Thin coats are better than thick because they carry

more oil, dry better and brush out more uniformly.

The pitch pine class of lumber is used to-day on most new buildings. It is not more difficult to handle, but requires different treatment. The priming coat should contain less oil and more turpentine. Probably two-thirds oil and one-third turpentine will be found best on an average and will give a surface that does not possess too high a gloss to take the second coat well. It should dry with a semi-flat or eggshell gloss surface.

The Pitch Pine Class of Surfaces

For the pitch pine class of lumber tests made under the direction of the New Jersey Master Painters' Association showed excellent results from the use of a priming coat mixed in the proportion of 34 lb. of Carter pure white lead, 66 lb. Carter dry red lead, 6 gal. raw linseed oil, 1 gal. turpentine and 1 qt. of japan drier. Finishing coats are of pure white lead mixed in the usual way. This requires a three-coat job, but it is cheap insurance against scaling paint, and three coats will usually wear enough longer than two to offset the little additional expense. When white lead is used with a primer on the pitch pine class of lumber the addition of one-half pint of benzole (solvent naphtha 160 deg.) to the gallon of paint, mixed as usual, will assist the paint to penetrate the pores of the wood more deeply and gain a better anchorage. Add the benzole to the priming coat only immediately before brushing it on. It evaporates rapidly.

Old surfaces to be repainted may likewise be divided into two classes for convenience, and here again the painter, like the doctor, must analyze. He must look carefully to see what is needed before he can intelligently prescribe the treatment.

Old Surfaces

One kind of surface is that which has always been painted with pure white lead and pure linseed oil, and simply has become discolored from smoke and dust. The oil has worn out pretty well, and after dusting off the building is ready for repainting with no additional trouble or expense. The old paint will soak up oil from the new and thus renew its binder and anchorage in the pores of the wood. Usually two coats of paint, mixed fairly thin and yet sufficiently heavy to cover well make a nice job under these conditions.

The other kind of an old surface to be repainted is the one upon which hard, inelastic paint has been used. Then even if the old paint is not cracked and scaled, it is usually too hard to be penetrated by the oil of the new coat and consequently the new coat of paint merely lays on the surface and must depend upon the old paint for its anchorage; it can not anchor itself in the pores of the wood.

Simple Concrete Step Construction

Details Showing an Easy Method of Making Steps Safe and Durable—Proportions of the Mixture

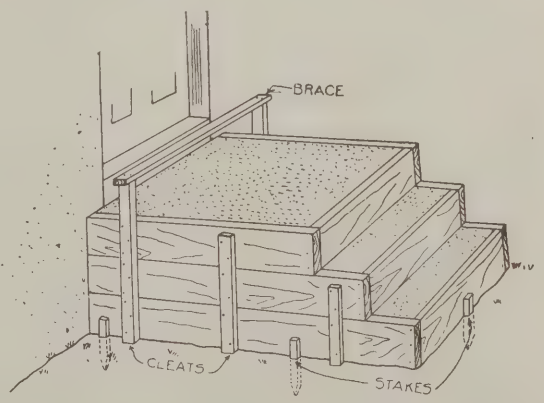


IT is a well known fact that the steps leading to a building entrance are subject to exceedingly severe usage, and where they are made of wood, with the lower portion in contact with the ground, resulting in alternate wetting and drying, decay is apt to be very rapid, making them unsafe and dangerous. Steps at the rear or kitchen entrance of the house encounter especially hard usage, but it is a very easy matter to have them durable and safe by constructing them of concrete. A simple method of doing this is shown in the accompanying drawing. The three forms consist merely of that many boxes open at top and bottom and also at the end adjoining the door-sill.

A rise of 8 in. and a tread of 10 in. will be found convenient. For this reason the height of each box should be 8 in., since every box will form a step. All of the boxes should be of the same width, but each one is 10 in. shorter than the one beneath it, thus forming the tread of the step. If the steps are few in number and not too wide, 1-in. boards will be stiff enough to hold the concrete without bulging, but if there is any doubt about this it is better to use 2-in. plank.

The concrete for the steps should be mixed in the proportion of 1 bag of Portland cement to 2½ cu. ft. of clean coarse sand to 4 cu. ft. of crushed rock or pebbles. The earth beneath the steps should be excavated to a depth of 6 in. below the surface, the excavation being the exact size of the bottom of the steps. Make sure that the earth is level and compact at the bottom of the excavation.

Place the largest box in position around the edge of the excavation, staking it in place at two or



General View of the "Forms" for Building the Steps

three points to prevent shifting. Level the first box very carefully by means of a carpenter's spirit level. The concrete, mixed rather dry, should be

deposited in the box and thoroughly tamped and compacted until moisture rises to the surface. Work or spade the concrete thoroughly along the sides of the "forms" so as to produce a smooth surface. At the front end of the box, where the concrete becomes the tread, the surface of the concrete is carefully leveled off and smoothed with a trowel for a distance of about 12 in. from the outer edge. Immediately after this is done the second and smaller box is placed on top of the first one, being fastened thereto by a few nails through the upright cleats shown in the drawing. The nails must not be so long as to project through the "forms" and into the concrete. Fill the second box with concrete immediately, being careful that no dirt or other foreign matter falls or collects on the surface of the first batch of concrete, as this would prevent a good bond between the two layers. Finish this step or slab in exactly the same manner as described for the first step. The last or third step is constructed in exactly the same manner as those previously described.

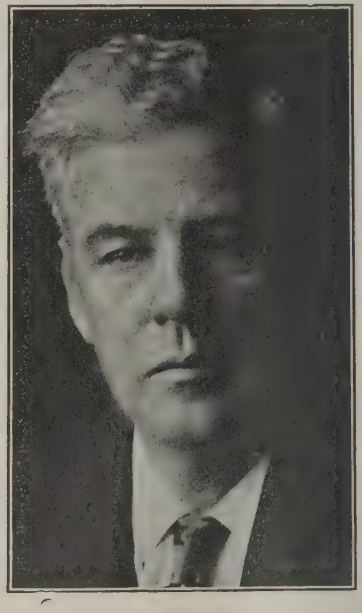
The brace between the two back cleats is for the purpose of preventing the boards from spreading at the side next to the wall. The outer surface of the top step is carefully leveled off with a straightedge and finished by troweling to a smooth surface. Excessive troweling, however, must be avoided. Not more than a half hour should elapse between placing the concrete for each step so that the concrete first deposited will not harden and set up before the next form is filled. After the steps are about one week old, the forms may be removed and the steps used. After the forms are removed any roughness or irregularities may be smoothed down and the surface of the entire steps finally finished by rubbing with an old piece of emery wheel and water or carborundum and water. Where the work includes many steps, a hollow space is generally left under the main body of the steps to effect a saving in materials. Where this is done the platform and steps are reinforced with steel rods or heavy wire mesh to prevent cracking.

Death of John A. Hill

John Alexander Hill, a dominant personality in the technical publishing field, died of heart disease in his automobile on his way to his business offices in New York on Monday morning, Jan. 24. His end is particularly sudden in the light of the recollection of his seemingly limitless energy and his apparently rugged physique; not yet 58 years of age and the head of a towering business which he had been building up in recent years, he was far from being regarded as at the retiring age, either from the standpoint of the industries he was serving or from that of the properties by which these industries were served and of which properties he was the head.

Mr. Hill's career is a notable example of a successful man who did not find his chosen work early in life. Born at Sandgate in February, 1858, he was 38 years of age before he became a publisher, although for eight years he had been editor of *Locomotive Engineering*. Prior to 1888, when he got his contact with the publishing business, he had owned and operated machine shops and had been a locomotive engineer. Following his editorship of *Locomotive Engineering*, he became president of the *American Machinist Press* in 1896 and in 1902 the Hill Publishing Company, of which he was president, was organized. Meanwhile, from 1900 to 1902, he served as mechanical engineer of the General Manifold Company, Franklin, Pa., building and superintending the arrangement of plant, designing special machinery, including continuous manifolding machines and other improvements in printing machinery, especially sheet-fed rotary presses.

As head of the Hill Publishing Company, he printed what are known as the Hill engineering weeklies; namely, the *American Machinist, Power, Engineering and Mining Journal, Engineering News* and *Coal Age*. He was president of the Mc-



THE LATE J. A. HILL

Graw-Hill Book Company, publisher of scientific books, and he established the Hill Publishing Company of London of which he was chairman, publishing the European edition of the *American Machinist*, and he established the Deutscher Hill Verlag, A.G., of Berlin, publishers of *Maschinenban*. One of the big monuments to the efforts of his later years is the great building which he erected on Thirty-sixth Street, New York, to house the editorial, business and printing departments of the Hill papers. Not only is this lofty structure a model in respect to the arrangement and equipment for the convenience and economies of the printing and publishing business, but it is conspicuous among New York's industrial buildings in the provisions for the safety, comfort and health of the employees.

Meeting of Agricultural Engineers

The American Society of Agricultural Engineers held its ninth annual meeting at the Hotel Sherman, Chicago, Ill., Dec. 28-30. During the three days' sessions many interesting subjects were discussed, and the papers and committee reports presented showed that much effort was put forth to make the gathering the most notable in the history of the organization.

Current News of Builders' Exchanges

Campaigns for Increasing Membership of Various Bodies—New Officers for 1916—Christmas Frolic

Christmas Frolic of Cleveland Builders' Exchange

MORE than seven hundred members of The Builders' Exchange of Cleveland, Ohio, assembled in Chamber of Commerce Hall in that city on the evening of Dec. 20 for the annual Christmas frolic of the exchange. The occasion was characterized by the presence of former United States Senator Theodore E. Burton, candidate for president, who at the close of his speech was presented with a miniature "White House" as a token of good wishes from the builders of his native city. A toy residence was presented to President Abram Garfield of the Cleveland Chapter, American Institute of Architects, who was another speaker during the evening.

A large representation of the architects was present due chiefly to the fact that a volunteer company of actors from the chapter put on a play, entitled "Selecting an Architect." This sketch illustrated the trials of a Board of Trustees in a neighboring village, choosing from among several architects the one who should design their proposed church.

A play depicting the difficulties encountered by the public in choosing between different kinds of materials was also a feature of the program, this play being entitled "Life's Toughest Problem, or Shall We Build of Lumber or of Brick?" The question was finally settled at the end of a two-act farce by the presentation of a composite house in which all kinds of materials were given due recognition. The sketch for this house was made by a Cleveland architect who received many compliments for his ingenuity.

Annual Meeting of New Orleans Contractors' and Dealers' Exchange

The annual business meeting of the Contractors' and Dealers' Exchange of New Orleans, La., was held on Monday, Dec. 13, when officers for the ensuing year were chosen as follows:

President .....Herman H. Thomas
Vice-President .....J. W. Lennox
Treasurer .....James M. McGowan
Secretary .....R. L. McChesney

A Board of Directors was also elected, consisting of seventeen members.

Annual Meeting of St. Paul Exchange

The annual meeting of the Builders' Exchange of St. Paul occurred in December, when officers for the ensuing year were elected as follows:

President .....A. P. Cameron
First Vice-President .....Paul Steenberg
Second Vice-President .....R. A. Beier
Treasurer .....O. Lampland
Secretary .....A. V. Williams

The president, departing from the usual custom, presented a brief report dealing with the general history of the work of the organization during the year, the details being submitted in reports of various committees.

The Exchange held its annual "Christmas party" at the Masonic Temple on Friday evening, Dec. 17, the number in attendance being 350. It was a representative gathering of the members, young and old, and embraced contractors, sub-contractors, materialmen, bondmen, etc., etc. The hall was appropriately decorated and a Victrola furnished appropriate music while the guests assembled. The president welcomed the guests in a few brief remarks, delivered several good stories, and then introduced the master of ceremonies—Santa Claus. The proceedings were of a decidedly humorous character and the attempt at preserving order was made by "Officer 666." For his services he was rewarded with a purse of $1.23. The affair closed with an excellent buffet luncheon, and following the usual custom the Christmas tree and trimmings were sent by the committee to the crippled children's ward at the City Hospital..

Sacramento Builders' Exchange

At a meeting held Dec. 23, the newly organized Builders' Exchange of Sacramento, Cal., named the following as a membership committee: W. Keating, C. Guth, R. Rowe, I. C. Boss, E. Hite, W. Scoville, C. V. Schneider, T. Enwright, P. J. O'Brien, E. S. Warner and B. Scollan. On Jan. 11 an executive committee of eleven members was to be elected.

Officers of Salt Lake City Exchange

At the recent annual meeting of the Builders' Exchange of Salt Lake City, Utah, J. H. Angell was elected president; Martin Benson, vice-president; J. M. Silvers, secretary; A. Rudine, treasurer. These officers with G. R. Cushing, E. H. Dundas and O. Chytraus constitute the board of directors.

Annual Meeting of Lansing Exchange

At the annual meeting of the Builders' and Traders' Exchange of Lansing, Mich., officers were elected for the ensuing year as follows:

President .....A. H. Heise
Vice-President .....E. L. Smith
Secretary .....Robert K. Orr
Treasurer .....A. L. Bertram

A resolution declaring the Exchange in favor of a Building Code in Lansing and authorizing the appointment of a committee of five to confer with the City Council was passed. It was also decided to affiliate with the National Association of Builders' Exchange.

Membership Campaign by Philadelphia Exchange

The Master Builders' Exchange of Philadelphia, Pa., has just been waging a campaign to increase the membership. There are in the city at least 2000 men engaged in the building business who are eligible to membership, and fifty teams consisting of two members each were organized for the purpose under the management of the chairman of the Membership Committee, W. Nelson Mayhew, president of the Iron Trades Association of Philadelphia. These teams were to compete for two handsome trophies to be awarded to those securing the largest number of candidates. Upon securing 1000 members the dues were to be reduced from $50 to $25 per annum. Latest reports showed that good progress was being made, and at a dinner given by the officials of the Exchange on Jan. 11 for the 100 field workers conducting the campaign, a unanimous decision was made to continue the movement until 2000 new members were enrolled.

Brief Review of the Building Situation

Building Operations for December in 120 Cities Show an Increase of 38.18 Per Cent Over December, 1914

THE value of the building operations for which permits were issued in December compares very favorably with the corresponding month of 1914 and brings the total to approximately the same as that for December, 1913. In this connection it should be borne in mind that December a year ago showed a heavy falling off as compared with the year previous, due to the uncertainties growing out of the European conflict. The reports which reach us from 120 cities of the country indicate a gain of 38.18 per cent, as compared with the same month in 1914, thus showing that the building industry has practically assumed a normal condition.

In the eastern zone, which embraces the territory lying east of Pittsburgh and north of Washington, there are forty-seven cities covered by the accompanying report, thirty-one showing increases and sixteen decreases, with a resultant gain of 39.37 per cent.

CITIES OF THE EASTERN STATES

	December, 1915	December, 1914
Albany	$458,850	$330,460
Allentown	21,850	37,275
Altoona	10,601	30,079
Atlantic City	442,344	132,812
Auburn	7,600	6,585
Binghamton	114,808	63,118
Bayonne	127,348	64,100
Boston	2,585,093	3,288,000
Bridgeport	701,740	186,574
Brockton	48,475	14,850
Buffalo	895,000	347,000
East Orange	61,066	115,771
Elizabeth	230,828	33,518
Erie	104,523	73,065
Harrisburg	108,450	17,100
Hartford	318,390	284,605
Hoboken	12,315	10,125
Holyoke	57,900	51,500
Haverhill	357,550	80,000
Lawrence	103,795	152,100
Manchester	54,615	197,467
Montclair, N. J.	256,259	91,061
Newark, N. J.	587,287	311,632
New Bedford	166,180	81,317
New Britain	22,065	22,900
New Haven	283,955	495,970
New York:		
Manhattan	4,126,085	1,544,744
Bronx	2,286,886	292,072
Brooklyn	4,297,930	1,598,315
Queens	1,407,909	845,007
Richmond	135,962	209,126
Passaic	49,475	36,300
Paterson	232,147	68,635
Philadelphia	2,703,070	1,261,350
Pittsburgh	2,995,596	3,473,100
Portland, Me.	75,230	40,500
Quincy	136,280	149,635
Reading	7,000	9,675
Rochester	647,300	363,599
Scranton	92,101	128,406
Schenectady	75,990	83,878
Springfield, Mass.	596,790	285,660
Syracuse	359,895	145,403
Troy	28,935	61,335
Utica	54,150	89,740
Wilkes-Barre	79,786	42,029
Worcester	226,822	175,440

The middle section of the country has the distinction of showing the largest increase, as compared with December a year ago, of the four zones considered. Here, thirty-six cities reporting show increased activity in twenty-nine, while seven show decreased activity in new work projected, the result being a gain of 47.65 per cent, as compared with December, 1914.

CITIES OF THE MIDDLE STATES

	December, 1915	December, 1914
Akron	$566,425	$143,420
Cedar Rapids	85,000	547,650
Canton	161,700	37,275
Chicago	10,640,200	6,214,050
Cincinnati	1,113,110	209,045
Cleveland	2,985,825	1,216,775
Columbus	150,340	1,005,200

CITIES OF THE MIDDLE STATES (Continued)

	December, 1915	December, 1914
Davenport	120,985	36,450
Dayton	120,195	23,195
Des Moines	82,355	48,700
Detroit	2,966,360	1,440,370
Duluth	172,491	78,975
East St. Louis	10,795	45,835
Evansville	523,842	13,333
Fort Wayne	106,500	272,000
Grand Rapids	130,770	125,750
Indianapolis	434,736	219,460
Kansas City, Mo.	612,525	223,600
Kansas City, Kan.	36,595	37,425
Lincoln	64,685	35,600
Milwaukee	760,467	430,007
Minneapolis	1,294,340	521,400
Omaha	643,830	216,475
Peoria	171,171	79,925
South Bend	17,003	35,980
Saginaw	12,195	12,450
St. Joseph	37,331	24,395
St. Louis	637,977	378,791
St. Paul	1,942,530	510,646
Sioux City	165,400	66,610
Springfield, Ill.	57,200	33,375
Superior, Wis.	19,240	18,395
Toledo	350,425	144,945
Topeka	26,750	6,625
Wichita, Kan.	188,050	31,700
Youngstown	336,125	38,405

The southern cities reporting show a gain of 42.31 per cent as compared with the same month the year before, there being seventeen cities showing increases and only two decreases, the latter being New Orleans and Savannah.

CITIES OF THE SOUTHERN STATES

	December, 1915	December, 1914
Atlanta	$254,459	$132,656
Baltimore	360,842	243,750
Birmingham	140,485	100,307
Chattanooga	92,726	28,258
Dallas, Tex.	311,169	110,025
Huntington	80,189	19,075
Jacksonville	236,663	79,800
Louisville	196,130	188,330
Memphis	110,040	52,200
New Orleans	172,892	274,172
Norfolk, Va.	199,227	54,070
Oklahoma City	61,850	7,865
Richmond	285,187	212,500
Savannah	29,475	42,945
San Antonio	334,500	69,295
Shreveport	87,012	17,817
Tampa	69,370	39,295
Washington	540,679	433,036
Wilmington	108,225	12,282

The striking feature of the results from Western cities is the heavy gain in operations in Los Angeles, San Francisco, Berkeley and Sacramento, while important decreases are found in Denver, Portland, Ore., Salt Lake City, Seattle and San Diego.

CITIES OF THE WESTERN STATES

	December, 1915	December, 1914
Berkeley, Cal.	$215,900	$73,700
Colorado Springs	9,265	10,000
Denver	128,440	593,510
Eureka, Cal.	6,585	5,250
Los Angeles	1,030,388	651,639
Little Rock	42,832	36,572
Oakland	286,549	278,891
Pasadena	101,372	48,648
Portland, Ore.	286,445	1,601,355
Sacramento	153,669	59,083
San Diego	64,179	173,135
Salt Lake City	78,760	171,450
San Francisco	1,138,966	717,903
San José	42,164	33,203
Seattle	605,385	1,298,165
Spokane	15,120	18,700
Stockton	129,369	25,420
Tacoma	55,088	43,475

For the entire year just closed the country shows a slight increase over 1914, due very largely to the greater activity in the last few months of the year.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Economy in Placing Concrete

THE great economy of the use of small concrete mixers in large foundation work was well demonstrated in constructing the foundations for the new building of the Methodist Book Concern, now nearing completion at the corner of Rush and Superior Streets, Chicago, Ill. This building is designed to house the publication department of the Methodist Episcopal Church in this district and is one of the highest type of reinforced concrete construction throughout, all floors being of reinforced slab concrete. The building occupies a ground area 125 ft. square facing the two streets and extending to an alley in the center of the block. By excavating to the curbs, the basement was extended 17 ft. beyond the building line on one street and 20 ft. on the other.



Fig. 1—Economy in Placing Concrete in the Foundation Construction Work of a Large Building in the City of Chicago, Ill.

The foundations and columns of the structure are designed to carry six stories but only four are built at the present time. The exterior of the building on the first floor is faced with Bedford stone, above which the facing is Hytex Rustico brick with a somewhat elaborate trim of maroon terra cotta. The design of the structure provides a very high basement for large printing presses. To provide ample overhead space in the press-room, the basement was designed for a clear space below the sidewalk of 12 ft. 6 in. The foundation piers rest on 45 ft. piling. To furnish a better foundation, the piling was driven an average of three feet deeper than first contemplated, which necessitated surmounting the concrete footings with foot pyramid bases for the piers. The footings for the piers are an average of approximately 9 ft. square by 18 in. thick and the surmounting pyramids are about 6 feet square at base, tapering to 2 feet square at the top. The retaining walls on all four sides of this building are approximately 13 ft. 6 in. high and are of reinforced concrete.

This construction required a very large quantity of concrete at and below the street level. To mix this concrete the contractor used two "Standard" low charging mixers, made by The Standard Scale & Supply Co., Chicago and Pittsburgh. A view of these mixers in operation is presented in Fig. 1. The great portability of these mixers enabled them to be readily moved along the work on the two streets and the alley side of the building and the depth of the basement permitted the spouting of concrete a considerable distance. By moving the mixers along in this manner, all of the concrete in the retaining walls on the two streets and alley sides and a considerable part of the concrete in the inner retaining wall was spouted from the mixers directly into the forms.

For constructing the pier foundations the mixers were placed close to the retaining walls and moved along as the work progressed. Placed in this position, it was possible to spout concrete directly from the mixers a lateral distance of 20 ft., which permitted all concrete in two rows of pier footings on the two street sides and three rows of footings on the alley side to be spouted from mixers direct to forms. For constructing the center pier footings concrete was spouted into bins from which it was gated into carts for delivery to the forms, but the portability of the mixers enabled them to be so placed that it was necessary to wheel very little concrete a distance greater than 50 ft.

The two wide sidewalks on the two street sides of the building were also constructed with these mixers by moving the machine along as the work progressed and spouting much of the concrete into place. It is estimated that fully three-fourths of the large quantity required at and below the street to this building was spouted direct from the mixers to the forms. This not only made possible rapid work but greatly reduced the cost of construction.

Fireplace Fixtures

In connection with the equipment of the modern dwelling, the fireplace is one of the features usually included not only for the cheer which it gives during the damp, chilly days when the furnace has not yet been started, but also for the comfort which is derived from the genial warmth it throws out. The fireplace as a device for heating homes is centuries old, but today it is used for style as well as for heating. It is furnished with those articles which add to its attractiveness as well as its utility, and modern ingenuity has improved its construction by the use of dampers, fire baskets, screens, etc., which increase its efficiency and render the fireplace perfectly safe. Bearing upon this important feature of the home the Stover Mfg. Company, 747 East Street, Freeport, Ill., has issued a catalog showing the assortment of artistic fireplace fixtures of colonial and modern design which it makes of carefully selected material and by skilled labor. The information concerning each article is of such de-

tail as to enable prospective purchasers to find no difficulty in selecting the pieces best suited to their requirements. A copy of the catalog can be obtained by any reader on application to the company.

"Northwestern" Concrete Mixer

The 5-ft. concrete mixer which has recently been placed upon the market by the Northwestern Steel & Iron Works, Eau Claire, Wis., while embodying no radical departures, combines old and proven pronciples of mixer construction with new "wrinkles" to produce a machine which is claimed to give exceptional value for the price. Among the special features of this mixer are a semi-convex discharge drum which eliminates the pockets behind the buckets and drum head, thus giving the contents of the drum an extra turn as they are thrust against the drum head by the action of the paddles, buckets, etc.; the drum track which is exceptionally wide; the counter-balanced drum which is chain-driven and a unique side-loading attachment. The attachment is compact, positive and powerful and the parts are all readily accessible for quick repairs. The engine housing is so arranged that the gearing is completely covered, thus complying with all "Safety First" regulations. The wagon track is standard gauge and the construction of the truck frame is heavy, the latter being made of 5/16 x 2 x 3 in. angle iron with hot

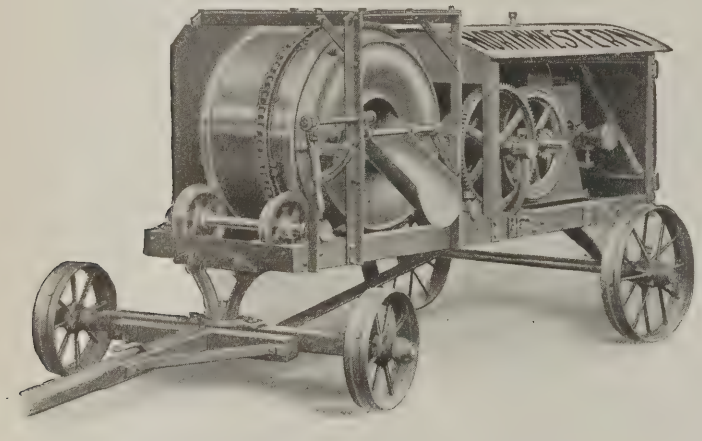


Fig. 2—The "Northwestern" Concrete Mixer

riveted cross sections and corner brackets. We understand that this mixer is also built with a 10-ft. capacity and both sizes will carry a 20 per cent over-load. A general view of the mixer is shown in Fig. 2.

New Handy-Man Book

A new work which contains much interesting and valuable information for the contractor or house owner along the line of modern plumbing and heating supplies has just been issued under the title of the Hardin Handy-Man Book, by the Hardin-Lavin Company, 4533 to 4543 Cottage Grove Avenue, Chicago, Ill. The book also gives much information on installing plumbing and heating supplies of all kinds the new Hardin easy-way as well as directions for making every known repair, together with other useful handy-man hints. We understand that a copy of this book will be sent free upon request. The company, which deals wholesale in plumbing and heating supplies exclusively, selling their goods direct, has just finished its new building, which greatly increases its facilities.

Sunlight Acetylene Gas Machine

The lighting of isolated houses is a problem which confronts the dweller in the country, and one of the solutions is found in the use of Sunlight "Omega" generators, illustrated in Fig. 3, and made by the Sunlight Gas Machine Company, 41 and 43 Warren Street, New York City. These generators are said to be so constructed as to secure the measure of safety prescribed by the rules of the National Board of Fire Underwriters. There are but two parts of the generator—the generator tank proper and the gas holder. At the top of the generator tank a hopper receives the

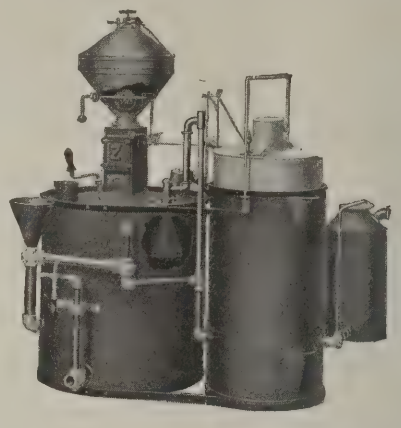


Fig. 3—General View of the Sunlight "Omega" Acetylene Gas Generator

carbide, and the quantity of the latter to be dropped or fed into the water of the generator tank below is automatically regulated by a feed device. The gas holder consists of a tank full of water, in which is placed an inverted tank with a bell which receives the gas from the generator and rises or falls with the income or outflow of gas, similar to the large gas tanks in cities. Special emphasis is laid upon the indirect feed of the Sunlight generator—a device simple but efficient in construction, consisting of a double oscillating or swinging shutter cup. The carbide in the upper part passes into the lower cup and thence down into the water so that there is no direct connection between the carbide in the hopper and the water below. The arrangement of parts is such that in case of a leak through a broken pipe anywhere in the building, for example, the machines is automatically stopped. Reference is made to the clear white diffusive light produced and to the economy of operation and maintenance. An attractive catalog which the makers have issued sets forth at length the merits of this generator and at the same time shows the general construction.

Parks' New Drum Sanding Machine

A drum sander which has just been placed upon the market with a view to meeting the demand for a low-cost machine is that illustrated in Fig. 4 and which is made by the Parks Ball Bearing Machine Company,

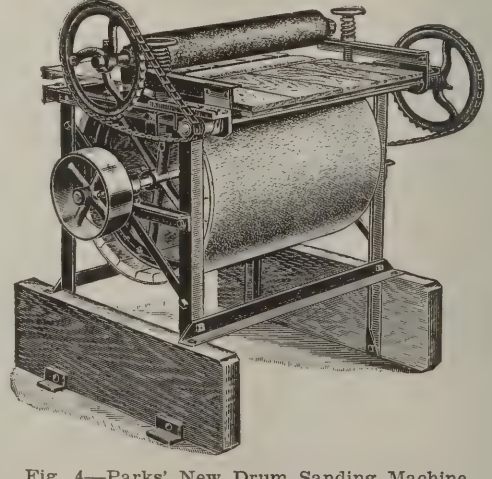


Fig. 4—Parks' New Drum Sanding Machine

Station A, Cincinnati, Ohio. The sand drum has proven to be a great labor-saving machine for smoothing up all kinds of hard and soft woods whether it be those which have laid around and require to be freshened up, or material that has never been planed. In the ma-

(*Continued on page* 80)

FREE 300 Certified Plans— Standard or Ready-Cut! Send Coupon!



Write TODAY for our 2 FREE Plan Books



Under date of Oct. 26, 1915, Chas. F. Spann of Oskaloosa, Iowa writes:—"I can recommend your materials for their quality, your price as being most reasonable and your promptness and square dealing as worthy of commendation. It is a pleasure to work such fine material."

Send now for our **two** plan books—**Ready-Cut Homes**—material cut to fit. **Standard Homes**—material in the standard way. Over 300 illustrations, floor plans, color schemes. All at **exact** prices. **Both books free!** Do your building at our **"Mill-to-Consumer" wholesale prices**—on any method you like. You add to your profits when you

Build The Gordon-Van Tine Way—at WHOLESALE Prices

We sell through **no** agents or dealers. From catalog **only.** Lowest selling expense strips our prices to **rock-bottom!** Not only have we **100,000 satisfied, enthusiastic customers among home owners** but over **10,000 contractors, carpenters** and **builders** also buy **regularly** from us. You do the same. Everything sold subject to **your** entire **satisfaction or money back.** Our plans contain hundreds of **ideas, new wrinkles and home suggestions. Highest Quality; lowest prices.** Distinctive homes with **class** to them—cosy bungalows, stately dwellings, comfortable cottages! Over 300 plans that will please your people. Every plan **proven;** all built hundreds of times. Makes no difference where you live: **we ship anywhere.** Also check coupon for our 156 page, illustrated book of

5000 Building Bargains

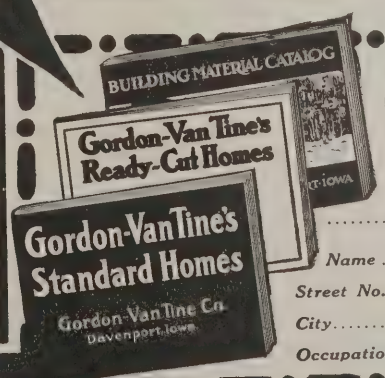
Packed from cover to cover with money-savers! A veritable **Builders' Encyclopedia** and price-maker! Rips the bottom out of building material costs and millwork prices. **Everything you need at big savings.** Roofing, Hardware, Paints, Varnish, Glass, Wall Board, Nails, Screens, Porches, Doors, Windows, China Closet Doors, Flour Bins, Pantry Drawers, Bathroom Fixtures, Door Panel Mirrors, **and over 5000 other items. Shipped anywhere. Safe delivery guaranteed. Prices all wholesale!** Contains the answer to every building need. Send for it! **Free! Use the Coupon.**



On Nov. 12, 1915, John Coffey of Mt. Sterling, Ill., wrote us:—"The car of millwork arrived and everything checked out correctly. I could hardly believe that a car could be gotten through in such short order. The quick service and fine material has made me a saving of at **least 25% on this job.**"

Gordon-Van Tine Company

In Business Half a Century! **808 Federal St., Davenport, Iowa**



Gordon-Van Tine Co., ! 808 Federal St., Davenport, Iowa

Please send me free the books checked.

- ☐ Building Material Bargain Catalog — Lumber, Millwork, Hardware, Paints, etc.
- ☐ Standard Home Plan Book
- ☐ Ready-Cut Plan Book
- ☐ Garages—Ready-Cut and Portable
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- ☐ Summer Cottages

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Mention here articles in which you are most interested.

Name .....

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Occupation .....



Plate K1007, Kohler enameled one-piece sink, with right-hand drain-board

The KOHLER trade-mark appears on every piece of KOHLER enameled plumbing ware. It is incorporated in faint blue in the enamel, at the point indicated by arrow.

A KOHLER SINK

will add to the attractiveness of any kitchen

KOHLER trade-marked sinks have no joints or cracks to gather dirt or make cleaning difficult.

A KOHLER sink will add attractiveness to any kitchen, and make a special appeal to every housewife.

The KOHLER trade-mark is a guarantee of the highest quality, and prevents substitution of inferior ware.

Choose KOHLER Enameled Plumbing Ware for bathrooms

The "Viceroy" built-in bathtub is something new in enameled plumbing ware. It is cast in one piece and has many other features that make it notable.

It is enameled all over; full size; 24 inch width inside; 3½ inch roll rim; lightest tub of its class and design; low price, due to manufacturing economies.

Your dealer will be glad to show KOHLER trade-marked, enameled plumbing ware and quote prices.

Write for our "Viceroy" book.

MAKERS OF Enameled Bathtubs, Lavatories, Sinks, Etc.

"It's in the Kohler Enamel"

KOHLER CO.
Founded 1873
Kohler, Wis., U.S.A.

BRANCHES Boston New York Pittburgh Chicago San Francisco London

chine here illustrated the self feed is such that it relieves the operator of the hard pressure required to hold a board by hand and also avoids the danger of a board being jerked from under the hand and thereby cutting him with the sandpaper. The roll, being covered with a coarse grade of sandpaper, serves to pull the board through. The feed works with a link belt from drive shaft and can be changed by using different sized sprocket wheels to feed fast and slow. It is adjustable for different thicknesses by means of handwheel screws which are provided with a spring to allow a variation of thickness up to 2½ in. betwen the roll and the sand drum. The feed is arranged to swing down below the surface of the table so as to clear it when extra wide material is being run or for sanding boards on the edge. The double-drum sander furnished by the company has a feed on each drum, the one in front being arranged so as to swing down in front of the machine while the other swings down in the rear of it so as to clear the table surface. The great advantage in using the double drum sander is that coarse paper can be used to cut rapidly on one drum while fine paper for finishing may be used on the other.

A New Lansing Concrete Mixer

No doubt many a building contractor doing country work has been greatly disappointed in not being able to purchase just what he wanted ever since concrete mixers were first placed upon the market, namely a high-wheeled wagon-tread mixer. He justly claimed that if the manufacturers of mixers had to take their machines over the rough country roads from one job to another his needs would soon be recognized and

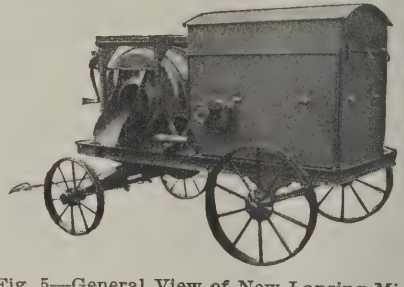


Fig. 5—General View of New Lansing Mixer

supplied. With this ever-increasing demand therefore in mind, the Lansing-Company, Lansing, Mich., has placed on the market what is known as the "Lansing No. 5 Roadster," a general view of which is presented in Fig. 5. This is a 5-ft. split bag machine. It has front wheels 24 in. in diameter and rear wheels 30 in. in diameter that follow a wagon track. It has in fact all the ear-marks of the larger and well-known Lansing mixers and is equipped with either side loader or batch measuring hopper, a rotary pump, silo hoist or folding platform. The side loader feature is the open end type, and is said to be the first open end skip ever placed on a small side-discharging machine. The company points out that it has plenty of power and this coupled with a minimum low weight renders it a desirable machine for country use. The motive power may be an Ideal or Novo engine according to preference.

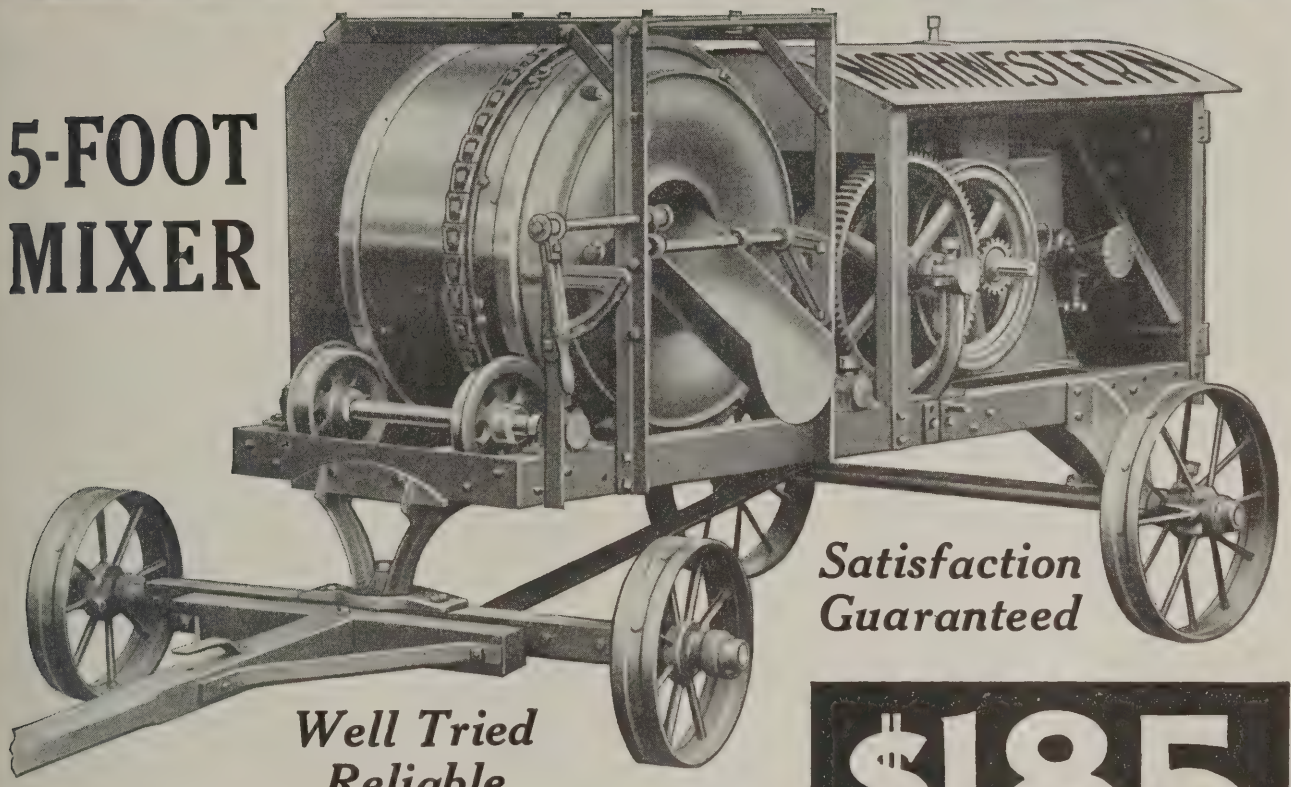
New Office Building for "Sterling Homes"

The International Mill & Timber Company, Bay City, Mich., well known manufacturers of "Sterling Homes," has recently taken possession of its new fireproof, hollow tile, brick-faced office building which covers an area 100 x 100 ft. in size. It is located next door to the mills of the company and on the first floor are executive offices done in mahogany and opaque glass for the doors. On the second floor are the incoming and outgoing mail departments, the customers' room, the typists' department with room for forty operators, the billing department and the manifold room, together with men's and women's cloak and retiring rooms. On the third or top floor is a large drafting room, flooded with light from numerous windows on two sides and also

(*Continued on page 82*)

"NORTHWESTERN"

5-FOOT MIXER



Satisfaction Guaranteed

Well Tried Reliable

$185

Built Complete in the Northwestern Factory

This mixer is built right—therefore it works right. A 3 H. P. hopper cooled engine, standard wheelbarrow hopper, steel housing and team pole with truck of standard wagon gauge. Weight 2400 lbs. Also made in 10 ft. capacity.

NOVO ENGINE furnished at small extra cost, if desired.

Northwestern Steel & Iron Works

EAU CLAIRE, WIS. **Capital $200,000.00**

Fill Out This Coupon—Cut Out—And Mail

Northwestern Steel & Iron Works,
Eau Claire, Wisconsin.

Gentlemen:

Please mail me your FREE Book No. 6 on concrete mixing, also details of your EASY PAYMENT PLAN. I expect to buy a mixer of about ..... cu. yds. capacity per hour.

Name .....

Address .....



The Bigger Market

The rapid increase in the demand for permanent, fireproof construction at popular prices has created a big market for dependable Concrete Blocks.

Many Contractors have realized this and are now supplying their trade with beautiful, permanent, fireproof Concrete Block structures at a cost as low as that of less desirable materials.

Ideal Concrete Block Machinery

because of its interchangeable and face down principles enables these Contractors to make a wide range of concrete blocks in many sizes, shapes and with varied surface treatments.

This is a business proposition of proven merit that holds big returns for the man who has the ability to give this business the attention it deserves.

We are experienced in equipping plants for the manufacturing of Concrete Blocks. Can we help you get started in this profitable business?

Ideal Concrete Machinery Company

1310 Monmouth Ave.

Windsor, Ont., Canada Cincinnati, Ohio



from the indirect lighting system that is used throughout the building. An interesting feature of the equipment in this department is the Wickes blue print machine which grinds out prints continuously all day long.

The partitions on the second and third floors are all glass and Beaver board panels.

Neponset Wall Board for Exhibition Booths

One of the many uses to which Neponset wall board can be advantageously utilized is in fitting up exhibition booths, the general effect produced being clearly indicated in Fig. 6, which represents a room for exhibition purposes in a large hall where many other exhibits were arranged. While only a temporary construction, it will be seen that it has all the attractiveness of permanency of an interior of a dwelling. In building this booth quartered oak and cream white Neponset finishes were used. These, it may be remarked, are waterproof,

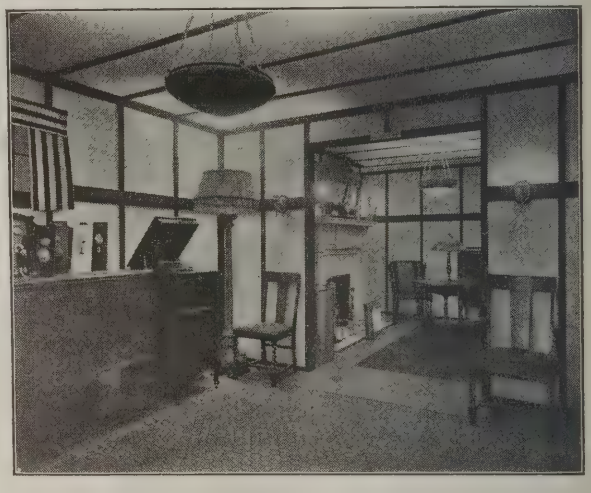


Fig. 6—Showing Use of Neponset Wall Board in Connection with Exhibition Booth Construction

requiring no painting so that it was simply a matter of putting up the sheets of wall board, covering them with battens and arranging the furniture and fixtures. These rooms not only make an excellent place for the exhibition of goods, but are of benefit to those putting up the material for the reason that they are the center of attraction and cause a great deal of comment on the part of the many visitors which crowd the rooms during the period of an exposition. The new heavy weight quartered oak Neponset wall board, also made by Bird & Son, East Walpole, Mass., is especially attractive and an excellent material for making wainscoting and paneling in dining rooms, etc.

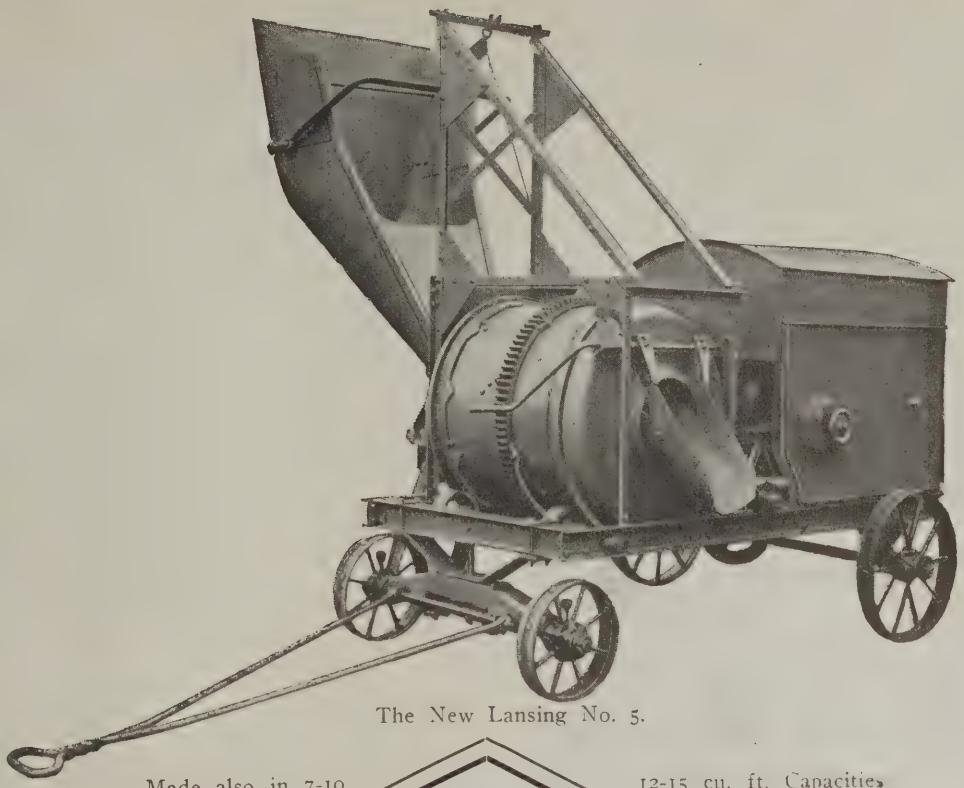
Winthrop Tapered Asphalt Shingles

A form of roof covering which is meeting with decided favor in various sections of the country consists of Winthrop tapered asphalt shingles which are referred to as being easy to lay, and which are shaped like wood. The shingles are made of wool felt and asphalt, and into the exposed surfaces of the latter fine chipped slate is rolled under heavy pressure. The shingles are made in red, gray-green and slate-black so far as colors are concerned; are low in cost, light in weight and very durable. They are laid on the roof with ordinary shingle nails. The Beckman-Dawson Company, makers of these shingles, with offices at 1400 Association Building, Chicago, Ill., will send samples and prices to any architect or builder who may be interested in this form of roof covering. As showing the satisfaction which the shingles have given, a firm of contractors using them on more than one hundred roofs of buildings located near salt water state that they have had only one leak to repair.

The Comfort Chemical Closet

Doubtless there are many carpenters and builders among the readers of this journal who are interested

(*Continued on page* 84)



The New Lansing No. 5.

Made also in 7-10. 12-15 cu. ft. Capacities

LANSING

Contractors
Are Laying the Foundation
of Their Reputations With

Lansing Equipment—Mixers to Wheelbarrows

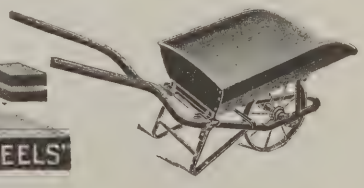
In every town or city there are one or more contractors who stand out from the others. The concrete jobs they do, large or small, stamp them as better contractors. The reason is simple enough. They are not only painstaking and careful with their work, but they employ the best concrete mixers and equipment; insuring their work being done efficiently and on time.

For every contractor there is a Lansing Mixer. It will help you do a better job and consequently get more business. Lansing Mixers have made great records for low concrete costs. You cannot afford to be without one. Do your own mixing and do it with a Lansing, instead of by hand. Put the profits into your own pocket. You may need them as much as somebody else. Light in weight, easily portable, they are quickly moved from one job to another. Lansing Equipment is behind the success of hundreds of contractors. Why not let it help you?

Send for Catalog No. 21F for full details.



LANSING COMPANY
"KEEP YOUR PRODUCT ON WHEELS"



LANSING, MICHIGAN

WAREHOUSES

New York.....288-289 West St.
Minneapolis.....517-519 North 3rd St.
San Francisco.....338-348 Brannan St.
Boston..78 Cambridge St., Charlestown Dis.
Philadelphia....Willow & No. American Sts.
Kansas City.....1413-15 West 10th St.
Chicago.....169 West Lake St.

CAUGHT IN THE ACT—



This "LITTLE DEVIL" was caught, as shown above, in the act of mixing 894 lineal feet of concrete for curb and gutter in one day's run.

The "LITTLE DEVIL" when caught was in front of the residence of the Mayor of Lake Forest, Ill.

The Polk Concrete Construction Co. is the proud owner of this machine.

You won't find many machines of the same size that will equal the record mentioned above—and they were not trying for a record. They simply had a contract to finish and were doing a good day's work.

If you are mixing concrete by hand, or if your present mixer is not doing an honest day's work—it is time for you to get acquainted with the "LITTLE DEVIL."

Don't wait.

Write today for an introduction.

If you are going to visit the Cement Show at Chicago be sure and call. The "LITTLE DEVIL" will be there.

Chicago Builders Specialties Co.
1415 Lumber Exchange, Chicago, Ill.

in adding to their business, especially during otherwise comparatively dull seasons, and they will therefore find much to command their attention in the proposition of the Comfort Chemical Closet Company, 322 Factories Building, Toledo, Ohio. It relates to the odorless, sanitary, germproof, Comfort, in-door closet, a sectional view of which is presented in Fig. 7. It is adapted for use in dwellings, schools, stores, hotels, public buildings and is recommended by physicians and State Boards of Health. It can be readily installed and is a great convenience in houses lacking sewage connection.

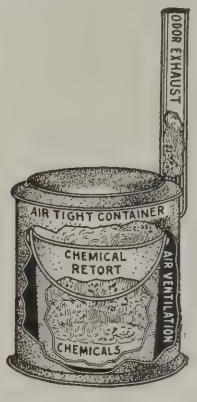


Fig. 7—The "Comfort" Chemical Closet

A circular which the company has issued gives full information regarding the details, and the builder who is desirous of being appointed agent in his territory for the closet can obtain the information by application to the address given.

A Fireproof Construction at Less Cost Than Wood

The growing tendency toward fireproof construction in connection with private residences is well illustrated in the residence of Prof. G. B. Pegram of Columbia University, New York City, and a general view of which is presented in Fig. 8. In harmony with the trend of safe building methods this substantial residence was constructed with Berger's Metal Lumber in conjunction with expanded metal lath, making an absolutely fireproof construction at "a smaller cost than the lowest bid of the general contractor based on the use of wood joists and studs for the building." It may be interesting to state that metal lumber is punched with prongs on the flanges to which expanded metal lath is attached. The blow of the hammer bends the prong up over the lath, thus clinching it securely so that no wiring of the lath is required. In this way "the necessary ground work for plastering and concreting was secured, and at the same time greatly



Fig. 8—House of Fireproof Construction Which is Said to Cost Less than Wood

facilitating the work while materially reducing the cost of construction." Berger's Metal Lumber and Expanded Metal Lath form a structure that is practically a unit and perfectly rigid even before concrete or plaster is applied. The elimination of combustible materials is the important factor in the results obtained. In addition a sound, damp and rodent proof construction is assured. This combination is also particularly desirable on account of its safety, strength, durability and economy, while a noteworthy feature is

(*Continued on page* 86)

I AM the New Low-Charging Mixer and my Family Name Is Smith.

Give Heed to My Story—

MY LOADING PLATFORM is only 16 inches high—
MY FEED OPENING in my drum is 24 inches in diameter—
MY CAPACITY is 3 cubic feet of wet, mixed concrete per batch—
MY OUTPUT is 5 cubic yards of perfectly mixed concrete per hour—
I DO NOT SPLASH, for my big scoop blades prevent splashing and insure a rapid, thorough mixing of all materials—
I AM BUILT OF STEEL throughout, except for my loading platform—
I DISCHARGE RAPIDLY. My steep-angled discharge spout empties the entire batch in 9 seconds—
I HAVE AMPLE POWER, which is furnished by a high grade, vertical gas engine—
MY DUST PROOF CASING protects my gear ring and driving pinion—
I AM THE SMITH MIXERETTE LOW-CHARGING MIXER—
I HAVE THREE BROTHERS—The 4 ft., 6 ft., and 9 ft., Smith-Chicago Low-Charging Mixers—
MEET US AT THE CEMENT SHOW, Booths 221-223 or
SEND FOR OUR FAMILY HISTORY. You will find it in
MIXERETTE LOW CHARGER CATALOG NO. LC-9-C
or
SMITH-CHICAGO LOW CHARGER CATALOG NO. LC-59-C

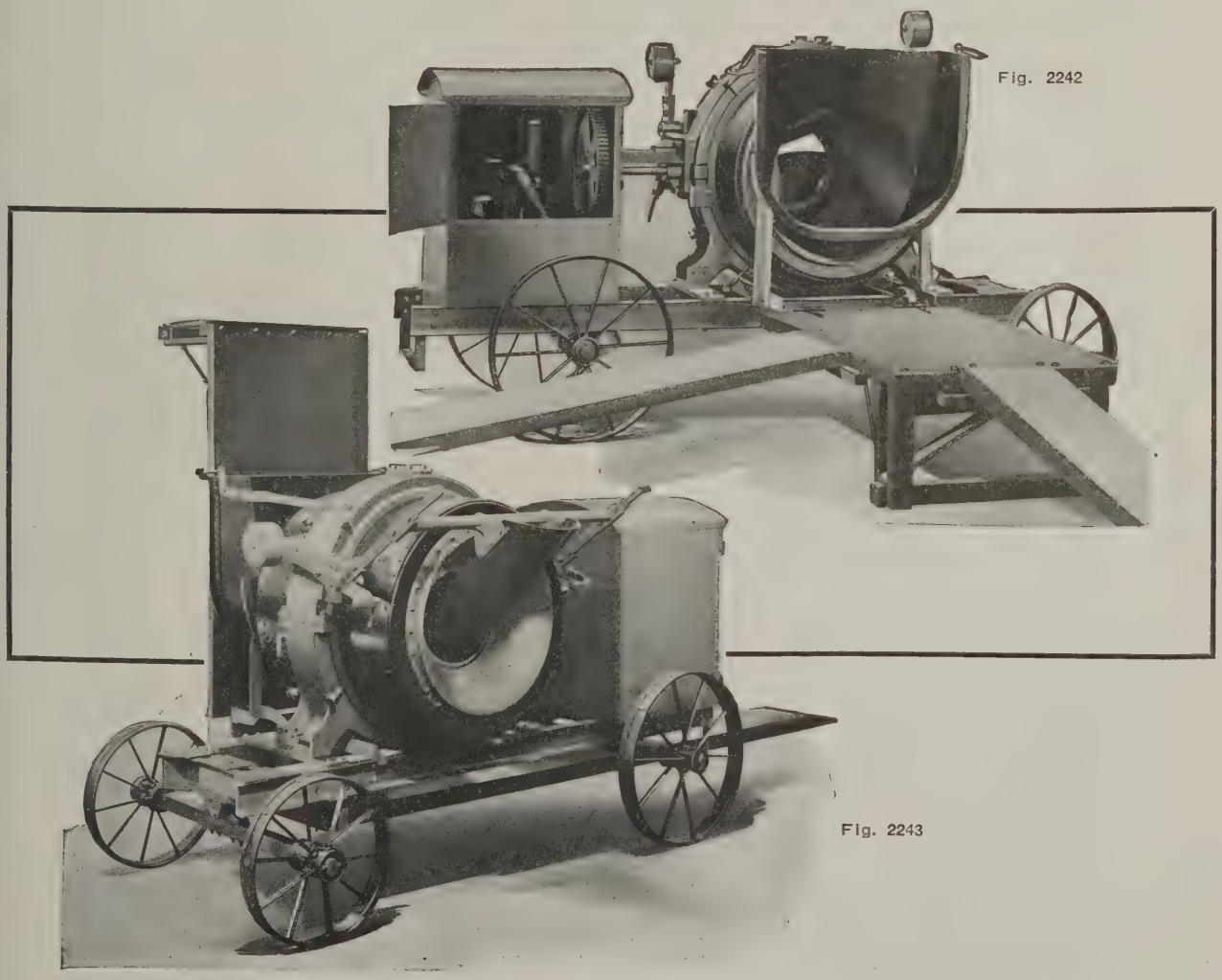


Fig. 2242

Fig. 2243

THE T. L. SMITH CO.

3120-C Hadley St., Milwaukee, Wis.
1461-C Old Colony Bldg., Chicago, Ill.

MEMBER OF NATIONAL ASSOCIATION OF MIXER MNFRS.

Our Mixer Capacities Based on N. A. M. M. Wet Batch Rating



Send for sample of FIBERLIC and prove our claim. Also ask about the special FIBERLIC paints and stains that come in 24 different colors and shades.

For Walls and Ceilings

Fiberlic

Made This Effect Possible

The bathroom illustrated here is an example of what can be done with FIBERLIC for distinctive effects in sanitation. This room was finished with white enameled FIBERLIC. After being applied it was treated with white enamel.

The builder who specified wall board for this construction selected FIBERLIC because he required a wall board that would be absolutely sanitary and vermin-proof. FIBERLIC reaches the 100 per cent mark of perfection in these and all other essentials. This superiority is due solely to the exclusive patented chemical treatment that impregnates every fibre.

FIBERLIC answered the call and proved more economical than lath and plaster because it is nailed right to the studding. It is also more serviceable than tile.

FIBERLIC has superior strength, durability and rigidity. It is odorless, fire-resisting, sound-deadening and thoroughly sized throughout.

You can safely specify FIBERLIC for any kind of room in any kind of building.

THE FIBERLIC COMPANY, CAMDEN, N. J.

LONDON (England) BRANCH: MacAndrews & Forbes, Ltd., Finsbury Court, E. C.

the fact that it can be used in any type of building and in any climate.

The architect of Prof. Pegram's house was William B. Claflin and the construction specialist was F. W. Conner.

The "Boss" Concrete Mixers

The American Cement Machine Company, 1180 Johnson Street, Keokuk, Iowa, has issued an attractive catalog entitled "Specifications," which relate to the leading lines of concrete mixers turned out by this concern. Special reference is made to the "Boss," which embodies a high speed "Re" mixing action which it is claimed mixes and discharges the concrete faster than is usually the case and with fewer drum revolutions. It is claimed that a batch may be mixed in 15 seconds and discharged in from 10 to 15 seconds owing to the fact that the discharge spoon extends nearly two-thirds the way through the drum and every one of the deep scoops or buckets discharges into it. The claim is also made that the machine will mix concrete, grout or semi-dry mortar and plaster. It is practically self-cleaning, and its constructive features are such as are likely to interest contracting-builders generally. It is made in sizes and styles to meet varying requirements and in the catalog in question full information concerning the salient features is set forth. Attention is also called to the "Boss" hoisting attachment, and to watering devices for concrete mixers. A page of the catalog is given up to detailed tables of capacity and weights of "Boss" mixers; also diagrams showing the general dimensions.

Architects' Convertible Level

One of the latest candidates for popular favor in the way of an architect's level is the instrument which we illustrate in Fig. 9. It consists of an improved 12-in. convertible level, and has been especially designed for the requirements of builders, architects and contractors. An important feature of the construction is a patented axis for converting the instrument from a level and adapting the telescope to sighting vertical lines. This axis is cast in one piece of hard phosphor bronze, which is claimed to increase rigidity and give a reliable and permanent adjustment. The axis is securely attached to the telescope by means of two thumb screws, and the arrangement is such that the change requires but a few seconds to convert the instrument for use as a level



Fig. 9—A New Architects' Convertible Level

from its position for taking vertical sights without detaching the axis from the telescope. This level is made by the New York Blue Print Paper Company, 58-60 Reade Street, New York City.

The "Diamond X" Expansion Shield

An expansion shield for lag screws which is said to be entirely new in its principle of operation and the

(*Continued on page* 88)

Visit Our Booths at the Cement Show

In the Annex—spaces formerly occupied—
we will show a representative line including:

MARSH-CAPRON RAIL-TRACK MIXER
MARSH-CAPRON RAIL-TRACK PAVER
MARSH-CAPRON GROUTER

Also the NAMELESS new one-bag
mixer just being placed on the market.

All these machines belong to the

"MOST MIXING — LEAST FIXING" LINE

Get posted in advance by sending **now** for free literature.

MARSH-CAPRON MFG. CO., 1462 Lumber Exchange Bldg., Chicago, Ill.
Member of the National Association of Mixer Manufacturers
Our Mixing Capacities Based on National Association Mixer Manufacturers Wet Batch Rating

THE REAL BOSS LOW CHARGER
MIXES CONCRETE MORTAR OR PLASTER

BREAKING SALES RECORDS
30 CARLOADS SOLD FOR FEBRUARY DELIVERY

STEEL TYPE
WITH
SELF-OILING HYATT ROLLER BEARINGS

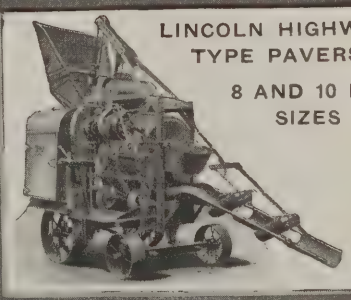
NOVO OR IDEAL ENGINES



20" HIGH
5
7½
10
15
FT. SIZES



GEARLESS POWER LOADER



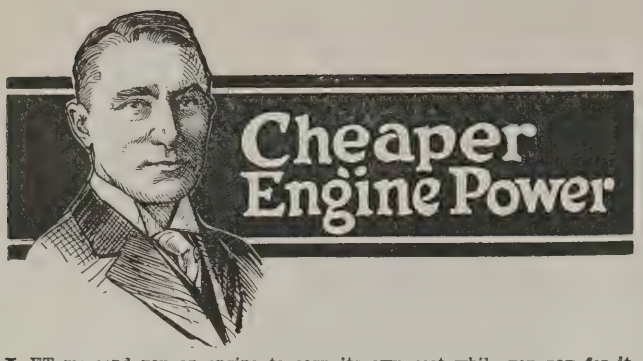
LINCOLN HIGHWAY TYPE PAVERS
8 AND 10 FT. SIZES

NOW SOLD AT THE MOST REASONABLE PRICES EVER ESTABLISHED
WRITE FOR PROPOSITION

THE AMERICAN CEMENT MACHINE CO., INC.
1180 JOHNSON ST. KEOKUK, IOWA

BRANCHES
Dyar Supply Co. 66 Broadway, Cambridge, Mass.
Edward Ehrbar 47 West St., New York City
Hoflus Steel & Equipment Co., Seattle-Spokane
R. H. Hyland & Co. 323 Wells St., Chicago, Illinois

BUILT IN SIDE OR REAR DISCHARGE
GAS. OR KEROSENE ENGINES



LET me send you an engine to earn its own cost while you pay for it. **Easy to start; no cranking**; easy to understand and manage; and easy to pay for on any suitable, reasonable terms of payment, during a year. I have helped many thousands to own engines in this way, during my 29 years of engine building.

WITTE Engines

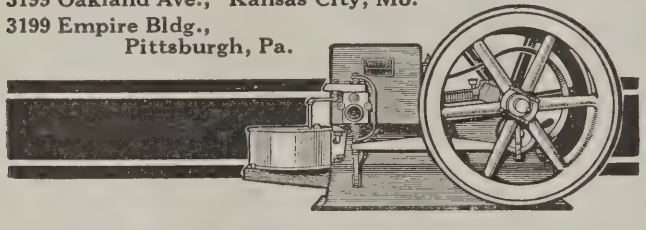
Gasoline, Kerosene and Gas

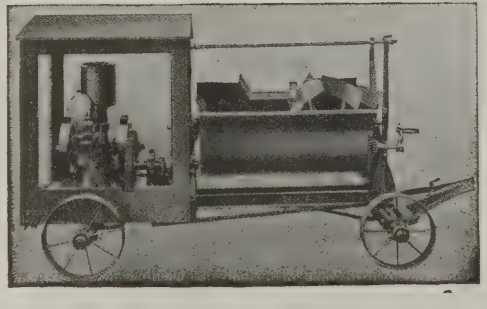
SEE THESE LOW PRICES: 2 H-P, $34.95; 3 H-P, $52.45; 4 H-P, $69.75; 6 H-P, $97.75; 8 H-P, $139.65; 12 H-P, $197.00; 16 H-P, $279.70; 22 H-P, $359.80. (*F. O. B. Factory.*) Portable Engines and Saw-Rig outfits proportionately low. **Guaranteed high quality**—as durable as superior design, best materials and workmanship can make.

Guaranteed 5 Years

Fine Book Free My book, "How to Judge Engines," will show you how to select the engine most suitable to your needs, and how easy it is to run a WITTE at any kind of work. Get my engine facts before you decide on any engine.

ED. H. WITTE, WITTE ENGINE WORKS
3199 Oakland Ave., Kansas City, Mo.
3199 Empire Bldg.,
Pittsburgh, Pa.





Blystone Batch Mixer

For Plaster-Concrete-Mortar

A saving of $25.00 per day was made in mixing hardwall plaster for the big Machinery Palace for the Panama Pacific Exposition.

The Cement Tile & Block Mfg. Co., of Osgood, Ohio, paid for their Blystone in three months work in their block plant.

One man slaked lime and made mortar for ten masons and had time to spare for other work on a job recently done by G. Ed Berry, of Harrisburg, Ill. Mr. Berry also says he got 10% more mortar per barrel of lime.

H. A. Farmer, St. Petersburg, Fla., recently wrote us as follows: "I am so well pleased with mixer, I want another just like it. Ship me another one as soon as possible."

Write for Catalog Today

Blystone Manufacturing Co.
1115 Day St., Cambridge Springs, Pa.

most radical departure in the line of expansion bolt design that has been brought out for a number of years is the "Diamond X" whch has just been placed on the market by the Diamond Expansion Bolt Company, 90 West Street, corner of Cedar, New York City. In Fig. 11 is shown a view of the shield with lag screws complete, while in Fig. 10 is shown the eccentric action of the screw. The statement is made that the screw enters the outer end of the shield through a central aperture and emerges from the side of the shield as it



"Diamond X" Expansion Shield. Fig. 10—Showing Eccentric Action of the Screw



Fig. 11—View of Expansion Shield with Lag Screw

progresses, thus bearing upon the side of the hole and with increasing displacement secures a powerful hold by it under contact with the wall and by forcing the shield against the opposite side. The device is referred to as the most simple form of expansion shield for heavy duty that has been devised, the shield being a single unit. The new shield has met with great favor among contractors, builders, plumbers, steam fitters, iron workers, and in similar lines of construction work. Until such time as all of the dealers have demonstrated this shield to their customers the Diamond Expansion Bolt Company is furnishing demonstration orders for this purpose. Such demonstration orders may be had by dealers now selling expansion bolts who desire to show the new shield to their customers. A free sample will be furnished upon application with the privilege of return should the new shield not prove in every way satisfactory to the user.

The "Keep Warm" Weather Strip

The "Keep Warm" metal door and window bottom weather strip illustrated in Fig. 12 has been placed on the market by the Up-to-Date Manufacturing Co., Inc., Lytton Building, Chicago, Ill. It is made of 22-gage cold-rolled steel, selected hardwood and genuine live rubber. While it was originally designed for installation on door bottoms only, the company discovered that it was equally effective on windows and many other places, where it has been used with excellent results. The steel is formed in such a manner that it lays



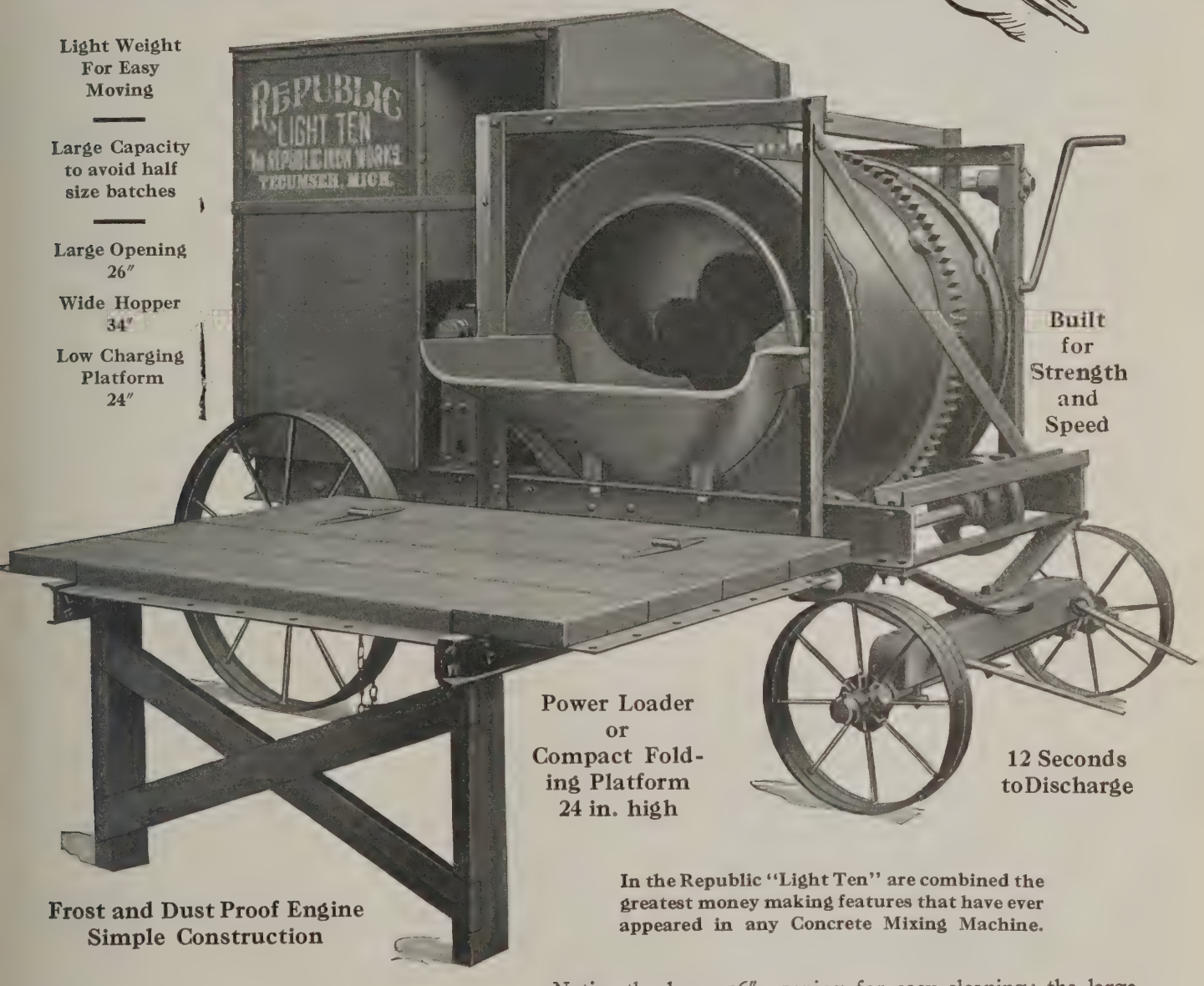
Fig. 12—The "Keep Warm" Weather Strip

tightly against the door at its top, while the bottom forms a watershed. The heavy rubber loop is fastened between the steel and the hardwood strip in such manner that it rides easily over the sill both ways when the door is opened or shut. When shut it lays tightly against the sill, rendering the opening absolutely weather tight. It has been found effective in keeping the house free from cold air, dust, rain and snow. It can therefore be used to advantage all the

(*Continued on page 92*)

A full sack-10 foot Size at a 5 foot price

Most Extraordinary Mixer Value Ever Offered
Combines Strength with Light Weight and Capacity with Low Price



Light Weight For Easy Moving

Large Capacity to avoid half size batches

Large Opening 26″

Wide Hopper 34″

Low Charging Platform 24″

Built for Strength and Speed

Power Loader or Compact Folding Platform 24 in. high

12 Seconds to Discharge

Frost and Dust Proof Engine Simple Construction

In the Republic "Light Ten" are combined the greatest money making features that have ever appeared in any Concrete Mixing Machine.

Concrete Machinery of All Kinds

When in the market for batch, continuous and mortar mixers of any size, block and brick machines, pipe moulds, ornamental moulds, cap and sill moulds, tools or concrete machinery of any description, write for catalog and prices on the Republic Line. You can secure better goods for less money from us.

Notice the large 26″ opening for easy cleaning; the large 34″ heavy cast hopper for rapid and easy loading; the rapid 12 second discharge; the sturdy compact steel construction; the heavy gears, and the 24″ low charging platform (automatic power loader if desired).

You will miss a great opportunity for a tremendous saving by not owning a Republic Mixer.

Let us tell you more about this splendid mixer, and the money you can save by its purchase and operation.

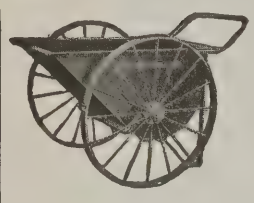
Republic

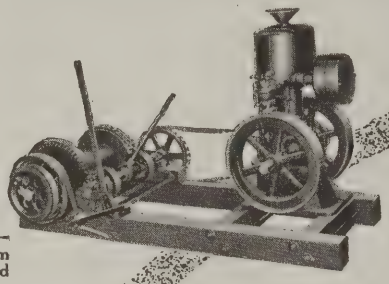
THE REPUBLIC IRON WORKS

Box 451 · Tecumseh, Mich.

Republic

"The STANDARD" Line





Reversible Light Hoist, especially designed for operating double platform contractors' elevators; readily adapted for direct hoisting with single line. Very simple reversing.

Greater Success depends on the equipment and the

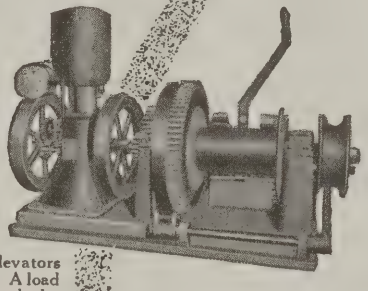
Just as the success of the modern battle depends on the performance of the troops and the efficiency of the artillery—so do the profits of the modern contractor depend upon the organization and the fitness of the equipment

Greater results are obtainable only when every piece of machinery fits the job—and its operation is both simple and economical.

Make every turn of the wheel produce—eliminate lost motion.

You who are getting ready for a big year should by all means consider the fitness of your equipment. Preparedness means just as much to the contractor as it does to our naval and military establishments. Don't judge or buy equipment on the price basis alone—adaptability and simple operation mean more than a few dollars to the busy contractor.

Be assured of constant service, low cost of operation, adaptability and simplicity by using "The Standard" line of equipment.



Reversible Hoist the most popuar size for operating Two-Platform Elevators up to five or six stories. A load can be held at any desired elevation by a heavy brake band with footlever and ratchet.

"THE STANDARD"

Have you noticed how many of these speedy workers are found on concrete jobs everywhere.

The low charging feature—making each outfit especially adaptable to every job and condition—cuts labor and power bill one third, to say nothing of the saving on first cost by eliminating the unnecessary charging devices, and avoidance of break down and delays.

Let us show you how adaptable low charging is to your work?



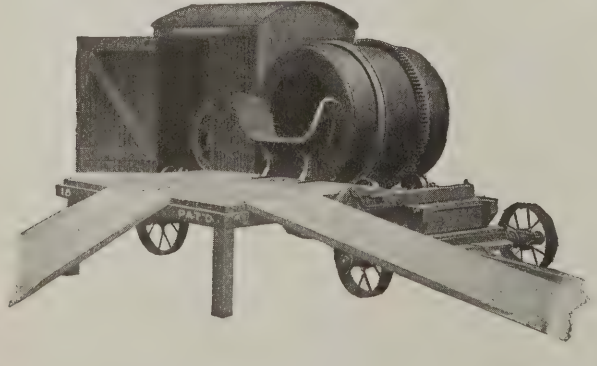
Single Line Hoists Suitable for a variety of work. The clutch mechanism is on the same shaft with the Drum. These outfits may be used for handling a Pile Hammer as well as for regular hoisting.

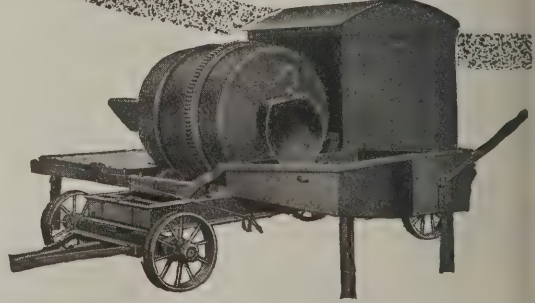
The Standard

Chicago
1345-47 Wabash Ave.

Pittsburgh
243-45 Water St.

Cleveland
1547 Columbus Rd.





An extremely valuable catalog,

of Contractor's Equipment

of your work
adaptability of your
simplicity of its operation

Hoists with gasoline power are desirable on account of the low first cost, the small expense of operation and the light weight, enabling the outfits to be placed in the most convenient position. Built in several sizes and capacities —single or double drum.

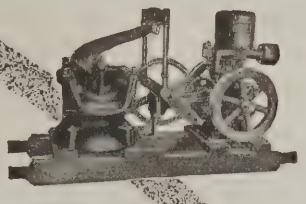
Pumping outfits with high grade gasoline engines, give excellent results and are a necessary part of modern contractors' equipment.

Hoist Tower Equipment furnished for use in connection with wood construction or complete with steel structure—they are easily erected and taken down.

Material Elevators are recommended for use with "The Standard" reversing hoists. Ask for our special low price on combination outfit for buildings three to five stories high.

Our Barrows and Carts are extra well made and balanced, consequently easy to handle.





—because of their economy of operation and maintenance, simplicity and durability are recommended for pumping from trenches, cellars, etc. Built in small sizes and capacities. Wood Skids or truck mounted.



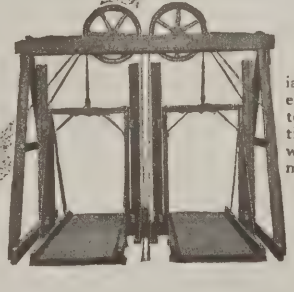
Concrete Towers great strength and rigidity with a design which permits erecting and taking down in the shortest possible time.

Low Charging Mixers

Low charging is conceded to be the most economical of all mixer charging method—this is obvious as there is only one operation, from material pile to mixer.

Besides this speedy method of charging in "The Standard" you get a **thorough mixing action**—this means better concrete—also will mix mortar and plaster.

Built in capacities from 3 to 40 cu. ft. and with or without power. The "SSS" Low Charging, Low Priced Mixers are built in 4 sizes, 3 to 12 cu. ft. capacities.



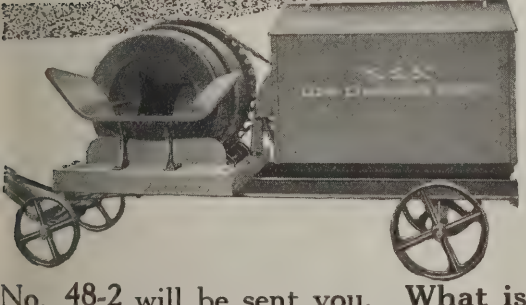
Material Elevators especially designed for rapid and economical handling of material in building construction. They are of light weight and can be quickly moved from floor to floor.

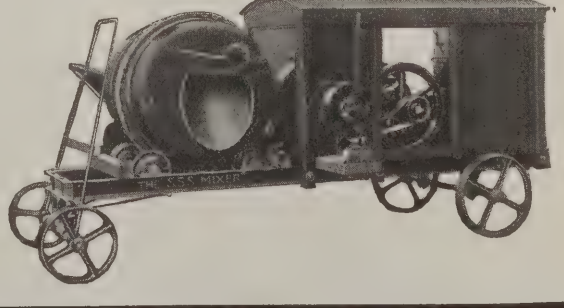
Scale & Supply Co.

Philadelphia
35 So. Fourth St.

New York
136 W. Broadway

Stocks carried in all principal cities





No. 48-2 will be sent you. **What is your address?**

CONCRETE FOR PERMANENCE

Build in Stucco

Well-built Stucco is beautiful, requires no painting and very little upkeep. Being well-built, it does not crack—it gives lasting satisfaction.



How to build Stucco

We have prepared complete specifications covering kind of construction, foundations, selection, mixing, application and setting of materials, and finishes. We will send them free upon request; also photographic reproductions of beautiful Atlas-White stucco homes.

The Atlas Portland Cement Co 30 Broad Street New York

Chicago Philadelphia Boston St. Louis Minneapolis Des Moines

PORTLAND ATLAS CEMENT

"The Standard by which all other makes are measured"

year round, for the company claims that it is not affected by any weather conditions and will last for years. It is made in two grades, standard sizes 29, 31, 33, 35, 39 and 41-in., or 1 in. shorter than the width of the door or window. Sizes between these are easily cut and special lengths are furnished to order. Grade A-1 is furnished in black enamel, baked on, and oxidized copper, while the second grade is made in black enamel only. Each strip is furnished with the necessary screws and is easily attached in a few moments on single or double hinged doors. Prices may be had on application to the company at the given address.

Ideal Engine Company

At the annual meeting of the stockholders of the Original Gas Engine Company, Lansing, Mich., it was unanimously decided to change the title of the corporation to "Ideal Engine Company." This change was made for the purpose of bringing about closer relationship between the title of the corporation and its products—Ideal gasoline engines and Ideal contractors' equipment. It was also voted to increase the capitalization from $150,000 to $300,000.

C-M-T Coating for Exterior and Interior Surfaces

Some interesting information relative to the use of what is known as "C-M-T" coating for exterior or interior surfaces, whether of cement, concrete, brick or stone work, is contained in a circular sent out by Eugene E. Nice, 272 and 274 South Second Street, Philadelphia, Pa. The coating is also adapted for floors, and in the directions which are given it is stated that two coats should be used in order to obtain the best results. The first coat should be applied with a fairly full brush, but well brushed out so as to secure a thin, evenly distributed coat. The second coat should be applied with a full brush and flowed out a little heavier but evenly distributed and not too much extended. The point is made that one day at least should be allowed to elapse between coats, and that the material should not be applied on a wet or greasy surface.

TRADE NOTES

Universal Portland Cement Company, Chicago, Ill., distributed a New Year's Greeting in the shape of a card worded as follows: "Universal Portland Cement Company thanks you for the pleasant and friendly relations it has enjoyed with you during 1915 and will do all it can to merit their long continuance. It hopes that the new year holds for you an unprecedented measure of success and happiness."

Wise & Ginsburg, civil engineers and architects, 11 Bloomfield Avenue, Passaic, N. J., have opened another office in the Post Office Building, Nutley, N. J., and would be glad to receive manufacturers' catalogues for their reference files.

Hyde-Murphy Company, Ridgway, Pa., makes announcement that its eastern office is now located at 10 East Forty-third Street, New York City.

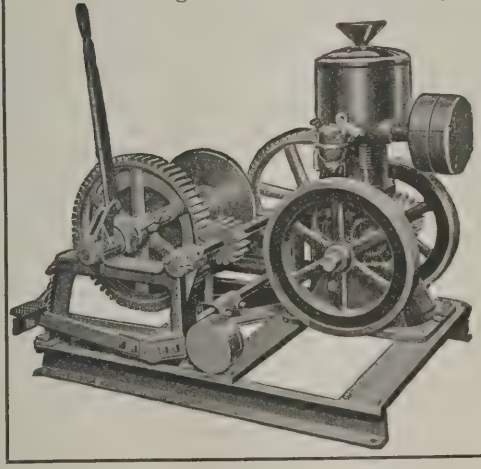
International Heater Company, Hickory Street, Utica, N. Y., points out that its International "Onepipe" heater opens an entirely new field for profits to the building contractor. As the heater has only one pipe it requires no skilled labor or tools to install other than a screw-driver, a hammer and a saw. The claim is made that it will comfortably heat every room in an average house of ten rooms or less. The heat rises from a single register through open doors and upstairs

(*Continued on page 94*)

"—it's a handy hoist to have on any job—"

IDEAL
CONSTANT SERVICE
POWER

The busy contractor will find in the Ideal "Single Line" Hoist one of the handiest pieces of equipment on the job.
Light in weight—sturdy in construction—low in operating cost and powerful in operation.
An adaptable hoist for handling short lifts under cramped or crowded conditions.
As a general builder's hoist it completely eliminates hand hoisting.
An Ideal "Single Line" Hoist costs less to buy—will outlast and give better service than any hoist on the market.



Ideal "Single Line" Hoists

Built 2 sizes, 4 and 6 H.P., capacities 900 and 1500 pounds—steel skid mounted, small floor space, 10-inch winding drum, extra strong brake. Drum will handle 650-foot ½-inch cable. Running speed 100-125 per minute.
By the way—note the power factor, the ever-ready Constant Service Ideal Engine.

The Ideal Engine Co.
R. E. Olds, Chairman
formerly
The Original Gas Engine Co.
East Kalamazoo Street LANSING, MICH.

LOOK FOR US AT THE CHICAGO CEMENT SHOW, BOOTH 189

You should certainly have our Booklet No. 516



Narrow Edger
Made in Iron or Bronze—8" long x 5/8" deep. Two sizes, 3/8" radius and 1/4" radius.



Iron Tamper
With 4 ft. wood handle. In five sizes, from 6" square to 10" square.

Large Groover
V-Shaped Groove
Made in Iron or Bronze. Cut 3/4" deep x 5/8" wide. Size 9" x 3".





Narrow Jointer
Both Ends Turned Up
Made in Iron or Bronze. Cut 1/8" wide x 1/2" deep. Size 8" x 1 3/4".



Corner Tool
Made in Iron or Bronze. 6" long. Sides 1½".

Stearns
Cement Workers' Tools

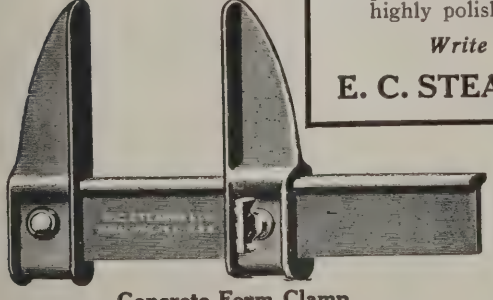
These are only a few of our complete line of cement workers' tools. Good value and thorough service in each one. Iron is close grained, finely polished, nickel-plated. Bronze is special hard, highly polished.

Write for Catalog of Complete Line

E. C. STEARNS & CO., 400 ONEIDA STREET Syracuse, N. Y., U. S. A.



Small Groover
Both Ends Turned Up
Made in Iron or Bronze. Cut 1/2" deep x 1/2" wide. Size 6" x 3".



Concrete Form Clamp
One jaw riveted to steel bar. Other slides and is securely held by thumb screw. Depth of jaws 4". In five sizes—from 8" greatest width to 30".

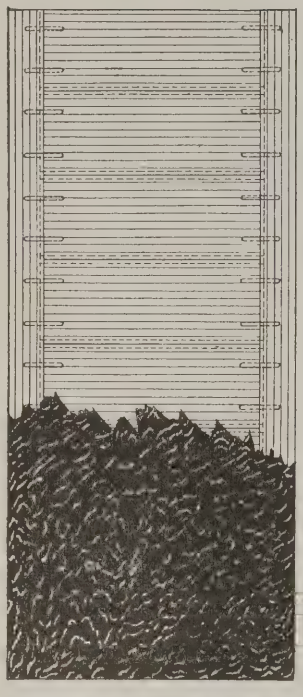


Indentation Roller
Made in Iron or Bronze. Two sizes—9" long x 3 1/4" diameter and 6" long x 3 1/4" diameter.



Edger
Made in Iron or Bronze. 6" long x 5/8" deep. Two sizes—3/8" radius and 1/4" radius.

"Sanitary Flush No Warp Doors"



Unequalled for entrances to bungalows, hospitals, schools, hotels, offices, etc. They are very attractive, never warp and are fire and sound retarding.

Furnished in many designs in any veneer and glazed with any design or kind of glass.

Read specifications and send for Catalogue.

SPECIFICATIONS:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

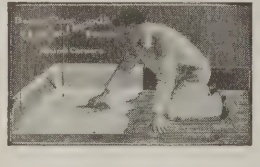
Specify and insist upon a construction as outlined and you will secure best results.

Hyde-Murphy Co., Ridgway, Pa.

New York Office:
10 East 43d Street

Pittsburgh Office:
6101 Penn Ave.

Keep Your Men Busy This Winter at a Big Profit to You



THERE IS A BIG PROFIT TO YOU IN SELLING AND LAYING "SANTILITE COMPOSITION FLOORING" IN THE DULL WINTER MONTHS.

As you know, "SANTILITE COMPOSITION FLOORING" is laid just like plaster ⅝ of an inch thick on any sub-floor of wood or cement—sets in 6 to 8 hours into a smooth, jointless absolutely sanitary surface without cracks to collect dirt, germs and filth—absolutely no trouble to keep clean—never grows dusty regardless of wear—extremely easy to stand and walk upon—fire will not burn it—water will not soak it—of permanent pleasing appearance—never requires painting and will last the life of the building.

"SANTILITE" is the ideal floor in the home for the kitchen, pantry, bath or any room where a sanitary, dustless floor is wanted. It is extensively used in the factory for offices, halls, lockers, toilets in the store, restaurant, cafe, public or semi-public building in areas subjected to heavy wear where a pleasing appearance, durability and absolute sanitation are required.

There are many masons, building and cement contractors who are making big profits in selling and laying "SANTILITE." It enlarges that branch of your business where there is an ever-increasing demand—every home with a wooden bathroom or kitchen floor needs it—every public place that has lots of wear must have it. You will find that there is little competition in your own locality and it is especially attractive, for it keeps your men profitably busy during the closed or Winter Season.

Write for samples, illustrated instructions for laying "SANTILITE" and our proposition to make your winter's work profitable.

SANITARY COMPOSITION FLOOR CO.
134 Plum Street, Syracuse, N. Y.

into the various rooms. A booklet containing the company's proposition can be obtained on application.

The Atlas Portland Cement Company, 30 Broad Street, New York City, has prepared complete Specifications covering stucco construction and makes announcement that it will send them free to any builder upon request. The Specifications cover the kind of construction, foundations, selection, mixing, application and setting of materials and finishes.

The calendar for the new year which is being sent out by the Samson Cordage Works, Boston, Mass., is a neat affair and intended for desk use. It measures 5 in. in width by 4 in. in height and consists of a heavy piece of cardboard, to the lower portion of which are attached the leaflets for the different months of the year. The space above carries the words, one above the other, "Samson Cordage Works," the letters being embossed in imitation of sash cord. Upon the back, or rather on the standard which supports the calendar, is a picture of "Samson Spot Sash Cord," which is the company's extra quality, "warranted free from imperfections." There are a number of colored spots in the cord and these constitute the company's trade-mark, being used only in this quality to distinguish it from common cords which are coarse and rough and wear out quickly by abrasion. The statement is also made that interested readers may obtain a copy of the company's catalogue and samples upon application.

Many a builder has found it profitable in numerous ways to make use of a motor truck in connection with his business, and wide awake and enterprising contractors all over the country will find interest in the announcement of the Federal Motor Truck Company, 562 to 570 Leavitt Street, Detroit, Mich., in regard to Federal trucks. The claim is made that this vehicle is a time and money saver for the building-contractor and some interesting figures regarding low-cost haulage can be obtained by writing the company.

J. E. Porter Company, 620 Fremont Street, Ottawa, Ill., offers to send to builders a copy of its New Barn Plan Booklet and complete catalog upon receipt of a letter containing the names of persons who expect to build or remodel barns. The company suggests that the local builder ascertain the prospects for barn building in his community, then call upon the company for any assistance relative to interior arrangement, construction, ventilation, etc., as the Porter Free Service Bureau is maintained for the benefit of all those interested in better barn construction and equipment. Floor plans are submitted without expense or obligation and any additional information is furnished upon application.

Lehigh Portland Cement Company, Chicago, Ill., has appointed T. L. Hughes District Sales Manager at New Castle, Pa., in place of P. A. Jandernil, resigned. The appointment became effective Dec. 28, 1915.

The Aberthaw Construction Company, Boston, Mass., is undertaking an exhaustive investigation regarding the effect of vibration of structures, and will greatly appreciate any suggestions or reports of experience that readers of THE BUILDING AGE may be able to send them.

Universal Portland Cement Company, Chicago, Ill., favors us with a poster calendar for the New Year which is of striking design. The upper panel is embellished with the picture of a hard-working man carrying upon his shoulder a bag of Universal Portland cement, while underneath is the inscription "Concrete for permanence." The calendar proper consists of twelve leaflets measuring 11 in. in width by 10¾ in. in height and printed in colors. The figures and lettering are of sufficient size so that the days of the week and month

(*Continued on page* 96)



Yes. We'll be there!

Stop around and see us.

Exhibiting the Jaeger "Big-an-Litle"
5 cu. ft. Mixer
Jaeger Big 10 cu. ft. Mixer
Jaeger Litle 3 cu. ft. Mixer
With or Without Builders' Hoist
An Outfit for Every Purpose

If you're unacquainted with the idea of one or more "Big-an-Litle" mixers versus the idea of the one cumbersome BIG mixer on the little job—or if you're looking for a GOOD big mixer at a low price—or if you want a very small mixer—here is your chance to familiarize yourself with the whole family. If you cannot come, send for printed matter—it's almost as good.

The Yaeger Machine Company
216 W. Rich Street Columbus, Ohio

Does the Work of 5 Men

Are you operating an old-fashioned mixing box? Or do you mix your concrete the Archer way?

An Archer Mixer will do the work of five strong men and will mix a better batch than they can ever hope to.

You can turn out 50 cubic yards of concrete per day with an Archer! It's a fast-mixing, easy-charging, money-making mixer. Light, portable, well balanced. May we send the catalog?

Archer Iron W'ks, Chicago, Ill.
2440 West 34th Place

The ARCHER

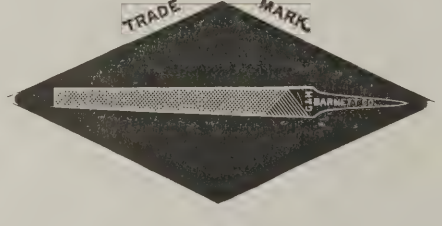






Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

may be readily seen from a distance. At the bottom of the poster and below the leaflets is a line reading, "40,000 bbls. daily."

The Diamond Expansion Bolt Company, 90 West Street, New York City, is distributing an illustrated folder telling how to reduce the "cost of making attachments." This, it is pointed out, may be accomplished by the use of "Diamond X" shields in holes drilled with a "Diamond" rapid fire drill. Reference is also made to Diamond screw anchors and Diamond reversible toggle.

Wayvell Chappell & Co., makers of the automatic ball bearing electric surfacing machine, recently illustrated and described in these columns, has removed its offices to 358 West Madison Street, Chicago, Ill., which is a much more central location and where the company has its full line of machines ready for demonstration.

Yale & Towne Mfg. Company, 9 East Fortieth Street, New York City, makes announcement of the appointment as general manager of E. C. Waldvogel, who has been connected with the company for the past eleven years and has successively filled the positions of traveling salesman, sales manager, and assistant general manager. In addition to the duties belonging to his new office Mr. Waldvogel will have general supervision of all sales, domestic, Canadian and export.

Among the pleasant incidents of the Christmas holidays at the works of the L. S. Starrett Co., Athol, Mass., was a gift to the 1000 employees of a sum equal to 2 per cent of a year's wages.

Link & Haire advise us that on Feb. 1 they will move their architectural office in Billings, Mont., to the third floor of the New Montana Power Building.

Ideal Concrete Machinery Co., 1310 Monmouth Avenue, Cincinnati, Ohio, points out that the rapid increase in the demand for "permanent," fireproof construction at popular prices has created a big market for dependable concrete blocks, and that the latter may be made on Ideal concrete block machines. The parts being interchangeable and use being made of face-down plates, enables the contractor to turn out a wide range of blocks in many sizes and shapes as well as with varied surface treatment.

The Republic Iron Works, Box 451, Tecumseh, Mich., is calling the attention of builders to its Republic "Light Ten" concrete mixer, which combines a number of "money-making features." It has, among other things, a 26-in. opening for easy cleaning; a large 34-in. cast hopper for rapid and easy loading; a rapid 12-second discharge; a 24-in. low charging platform with automatic power loader if desired; heavy glass and a compact steel construction.

The Louden Machinery Co., 5401 Court Street, Fairfield, Iowa, has issued an interesting work entitled "Louden Barn Plans" containing 112 pages of practical information relating to the subject indicated. There are more than fifty plans of barns and other farm buildings and the book treats of every phase of modern barn construction, drainage, concrete work, lighting, ventilation, etc. The published price is $1, but the company states it is free to those who build barns.

E. C. Stearns & Co., 400 Oneida Street, Syracuse, N. Y., shows in a catalog which it is distributing a few of its complete line of cement workers' tools. The latter are of such variety as to meet all reasonable requirements and are made in iron or bronze, thus rendering them strong and durable. A copy of the catalog in question can be had by applying to the company.

(Continued on page 98)



THE "BAILEY" IRON PLANE has been the STANDARD for over FORTY YEARS and has always maintained the leading position.

From time to time, other Iron Planes, made in imitation of this celebrated plane, have appeared upon the market.

These imitation Planes are often put up with numbers and labels designed to make the consumer think that he is obtaining the "BAILEY" Plane.

We are the sole manufacturers of the "BAILEY" Plane. Every Plane has the name "BAILEY" and the number cast in the bottom and the name "STANLEY" is stamped on the cutter.

Always insist that your order be filled with Planes made by THE STANLEY RULE & LEVEL CO., which carry with them a GUARANTEE backed by a company that has been manufacturing Carpenters' and Mechanics' tools for over half a century.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.



Have You Received, YOUR Copy of

LOUDEN BARN PLANS

?

It's Full of Practical Money Saving Information Every Barn Builder Needs.

LOUDEN BARN PLANS contains 112 pages of the most practical barn plans and barn building information ever published in book form. It contains plans, descriptions, and estimated cost of more than fifty barns and other farm buildings. It treats every phase of modern barn construction, drainage, concrete work, strength of materials, lighting, ventilation, etc.

The published price of LOUDEN BARN PLANS is $1.00; it's free to you if you build barns.

This book will help you secure more barn contracts. Write for your copy today.

THE LOUDEN MACHINERY COMPANY
5401 Court St., Fairfield, Iowa
"EVERYTHING FOR THE BARN"
Do you want our catalog?

An Improved Convertible Level



for Architects Builders Contractors

For use as a level or for taking vertical sights.

Why pay for a surveyor's or engineer's transit when this instrument will take your angles?

The price is low.

Our exclusive feature: Patented one piece friction resisting phosphor bronze axis, by means of which level is converted into a transit in a few seconds without screws needing adjusting.

Write for catalog of Convertible Level and our full line of drawing materials, etc.

New York Blue Print Paper Co.
58-60 Reade St., New York



Patented Axis

THIS MACHINE WILL EARN $20 to $50

Daily Profit for You

Making Cement Bricks and Blocks



Factory owners are the biggest money makers in America and this machine will place you in their ranks. You can start with little capital and even without experience. This machine makes pressed cement bricks and blocks under **80,000 pounds pressure.** No tamping and easy work. It makes 1,000 blocks or 10,000 bricks daily. No burning required. Ready for the market in a few days' time. They are necessary for the

Helm DRY WALL Building System

This is the system that appeals to builders, contractors and architects. It overcomes the opposition to concrete because it offers absolutely **DRY WALL** construction. It saves money for builders, as **no furring and lathing are required,** and it makes **rigid walls** and **fireproof walls.** This is the system which is bound to get you business and give you the advantage over all other products. **$50 and up starts you.**



Send for This FREE CONCRETE BOOK

Tear off the corner coupon right now before you turn the page. Let this free book tell you all about this great opportunity which is open to you today. It will tell you all the details of this system, about the Helm Press and the DRY WALL building system. It will show you how easy it is to start a profitable business. It tells how each product is made, how it is cured and sold. Write today. Do it now.

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Cadillac, Mich.

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282 Mitchell Street
Cadillac, Mich.

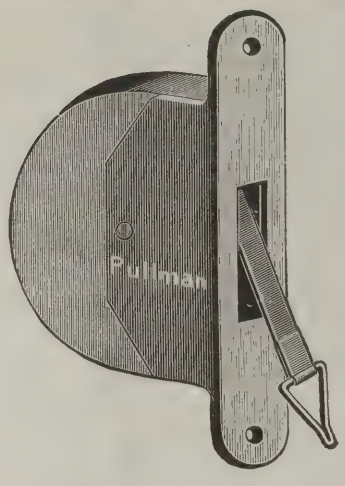
Please send FREE the book on concrete and Helm Presses.

Name.....

.....

Address.....

Pullmanize Your Windows



Unit Sash Balances

Over Five Million in Use

The demand for anything never reaches into the millions, unless there is downright merit in the product.

'Way back in June, 1890, over twenty-five years ago, the General Hospital (Surgical Building), Rochester, N. Y., installed Pullman Unit Sash Balances. They report that these Balances are in fine working order today. Their noiseless operation appealed to them.

In the Wilsonia, a fine modern apartment in Rochester, Pullman Unit Sash Balances are used for all the windows. The windows are large and the service severe. The owner says: "They move as noiselessly and easily as though supported by an air cushion." He also reports a saving of about $1.00 per window through their use.

Pullman Unit Sash Balances are fast supplanting cords and weights. They require only a small mortise, and as they have a uniform size face-plate, the mortises can all be cut **at the mill** when the frames are made.

Every balance is guaranteed to give satisfactory service for 10 years. Does such a balance and such a guarantee interest you?

We issue a handsome catalog with blue prints. It's worth sending for.

Pullman Mfg. Company
8 Industrial St., Rochester, N. Y.

Willis Mfg. Company, Galesburg, Ill., has issued an interesting catalog covering fireproof metal doors and windows, skylights and ventilators, a copy of which can be had by any reader of THE BUILDING AGE upon application to the address given.

The January issue of the "Grinnell Automatic Sprinkler Bulletin," published quarterly by the General Fire Extinguisher Company, 271 West Exchange Street, Providence, R. I., contains some very interesting information regarding the protective merits of automatic sprinklers when properly installed in buildings, and cites a number of recent fires which emphasize the necessity of sprinkler protection.

Imperial Brass Mfg. Company, Harrison Street and Racine Avenue, Chicago, Ill., has recently issued an attractive catalog of Imperial hardware products, embracing, among other things, door guards, push plates, thresholds and kick plates. While the company has limited the listing to such designs as might be termed standard patterns, it has a large assortment of designs not shown within the covers of the catalog. Among the numerous illustrations is a door embellishment designated as "an Imperial Creation," designed and constructed for P. & F. Corbin.

Diamond Metal Stamping Company, Kerr Street, Columbus, Ohio, is distributing an attractive folder relating to the metal weather strips which it manufactures, adapted to doors and windows of all kinds. Special attention is directed to the many features embodied in this weather strip and emphasis is laid upon the fact that the phenomenal growth of the company's business in the past five years has been due to the satisfaction which the strip has given. Accompanying the folder is a pamphlet showing 102 houses of the Girard Estate, Philadelphia, Pa., the doors and windows being fitted with Diamond metal weather strips. In addition to the halftone engravings of the houses in question there are pages of letters from some of those who have used the weather strip in question and testifying to the satisfaction which it has given.

Architects, builders and contractors will be interested in learning that the business of the Dearborn Hardware Mfg. Co., Carroll Avenue, has been consolidated with the Payson Mfg. Co., 2920 Jackson Boulevard, Chicago, Ill., and these united interests will continue the business under the style and title of the latter named concern. The Carroll Avenue factory will be continued to be operated indefinitely.

We will receive applications for high grade draughtsman, experienced in all kinds of elevator work. Good salary and future assured to the right man.
Address "H. A.," care *Building Age*, New York.

Better Lumber

A. Van Buren, Hazelton, Idaho, writes: Am satisfied, I saved more than $250, besides getting better grade materials.

Oscar Indergard, of Gorham, N. D., writes: We saved $300. When we need more lumber, we will know where to go to get good lumber, cheap.

At big Saving

K. M. Roti, of Fairview S. D., writes: Very highly pleased with the quality of the material, also my client. He saved $188 on this bill.

Will Sharp, Springale, Mont., writes: Your $19 lumber costs $30 here; your $16 lumber costs $28 here.

Write H-L-F NOW

You can't beat this combination of better lumber at a big saving. Deal direct with H-L-F—the producers. No middle profits. No in-between sorting. But *better* lumber for less money.

WRITE TODAY, sending your bills of materials for quick quotation, or send sketch of house showing dimensions, for quotation without material bill.

Big savings possible by buying now, *and sleighing means easy hauling.* Send 10c for Prize Plan Book, 4c for Barn Builder's Guide. New Millwork Catalog and H-L-F House Pricer free on request.

HEWITT-LEA-FUNCK CO., 259 Funck Street, Sumner, Wash.
Capital $1,000,000 Not in any trust or combine



The Building Age

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Prevents Drafts, Dust and Window Rattling



PATENTED

The only stop adjuster made from one piece of metal with solid ribs and heavy bed that will not cup or turn in tightening the screw.

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Manufacturers of Builders' Hardware

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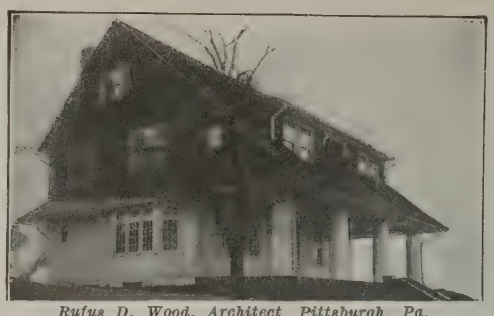
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We use choice White Oak quarter sawed.
They are properly kiln dried.
Our workmen are thoroughly skilled.
We have been building hardwood floors for twenty years and know how to do it.
We are bound to serve you faithfully.

Ask for Colored Floor Plates

The Interior Hardwood Co.

Manufacturers INDIANAPOLIS, IND.



Rufus D. Wood, Architect, Pittsburgh, Pa.

Read what this Architect says about his own house, which is stained with

Cabot's Creosote Stains

"The shingles of the roof and second story are stained with your brown stain and the plaster on the outside columns with your white Waterproof Cement Stain. A number of the shingled houses in my neighborhood have been stained with creosote (?) stains manufactured by local concerns and their colors are very muddy and disagreeable and do not seem to stand the weather, while mine has retained the original nut-brown color which I desired."

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are the only artistic cement finishes. They give soft, natural coloring effects, without covering the surface with a painty coating. They are also cheaper than coatings and easier to apply, and they cannot crack or peel.

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BOSTON, MASS.

1133 Broadway, N. Y. 24 W. Kinzie St., Chicago

Cabot's Conservo Wood Preservative, Stucco Stains, Brick Stains, Damp-proofing.

Samson Spot Sash Cord



Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.



The Spots on the Cord, in any color, are our trade mark, used only with this extra quality.

Samples and full information gladly sent.

Samson Cordage Works

Boston, Mass.



A House

LINED WITH

MINERAL WOOL

is warm in winter, cool in summer and is thoroughly **deafened.** The lining is vermin proof; **Mineral wool** checks the spread of **fire** and keeps out dampness.

U. S. MINERAL WOOL CO.

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The Building Age

NEW YORK, MARCH, 1916

The Bungalow We Built by the Sea

How an Architect Expended $1,500 in Constructing a Home of the Cozy-Cottage Type

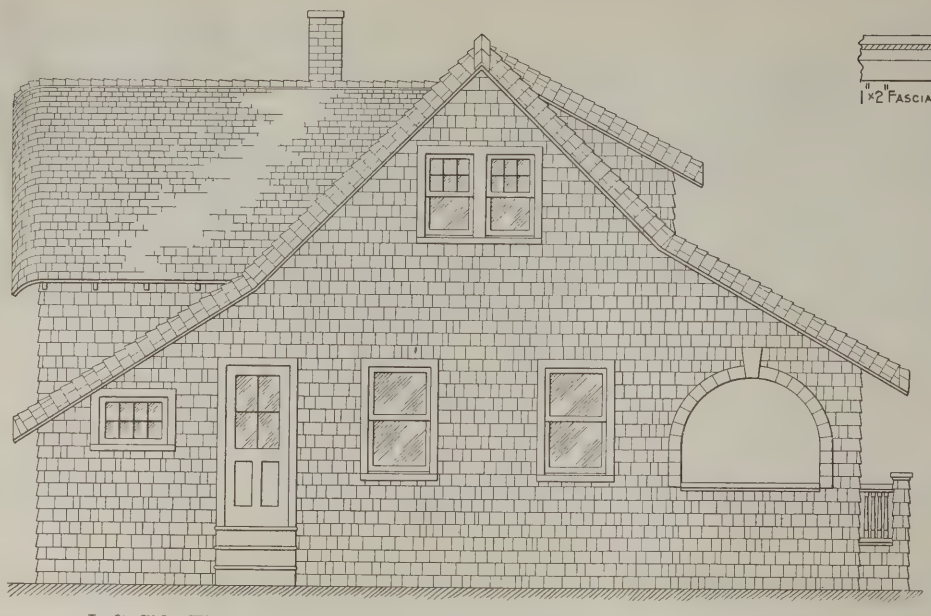
By L. Jerome Aimar

SINCE the publication in these columns of the "Reminiscences of a Bungalofer" the writer has been in receipt of numerous letters requesting a further description of the little home mentioned in that article, and these have led him to believe that other readers of The Building Age might be equally interested in the subject. I wish to say at the start that in the construction of the building there was not an item of materials used that is not carried in stock by local yards of any pretentions throughout the country. No moldings of any character were used except in the case of the porch railings, the turned balusters for which I had on hand and which required a molding to correspond.

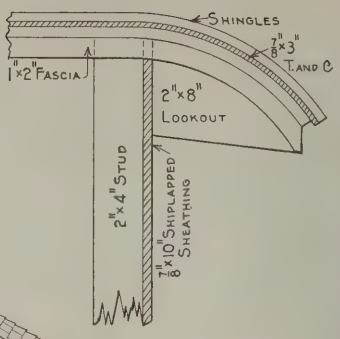


Exterior View of the Cozy Cottage Which a New Jersey Architect Built By the Sea

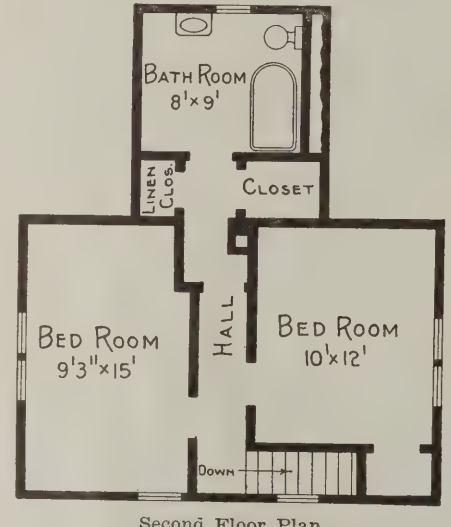
It may be interesting at the outset to say some-



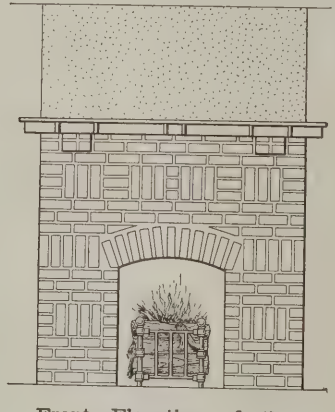
Left Side Elevation Showing Entrance to Kitchen—Scale, ⅛ in. to the foot



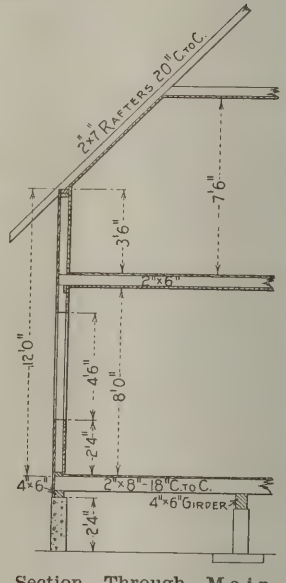
Detail of Gable Cornice — Scale ¾ in. to the foot



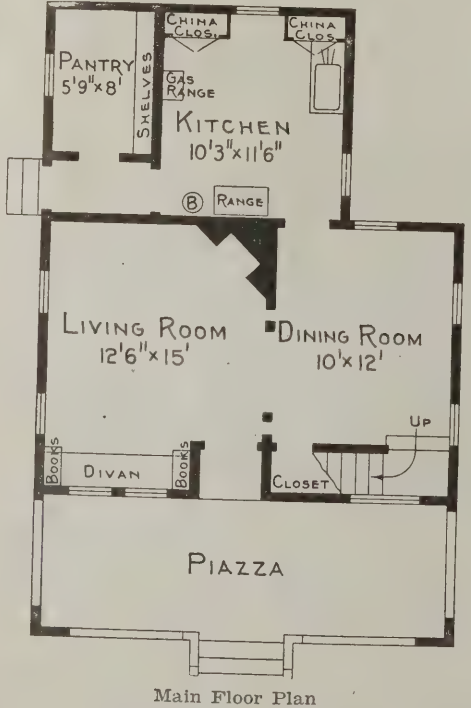
Second Floor Plan



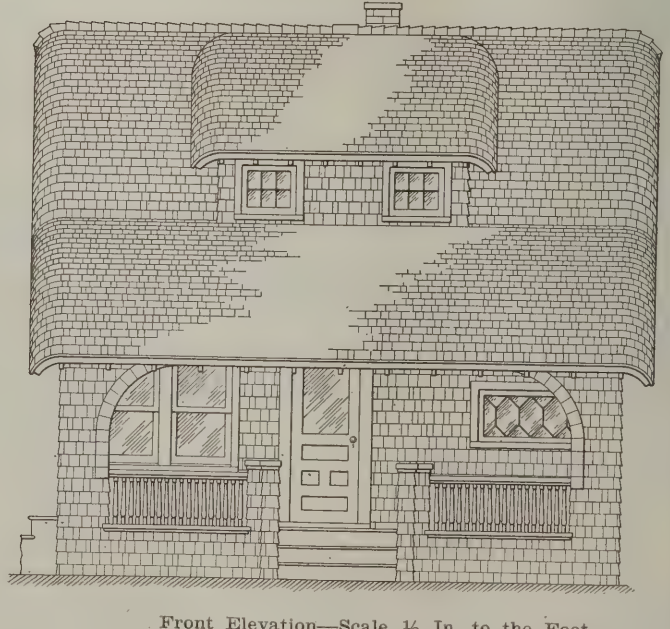
Front Elevation of the Open Fireplace for Burning Wood



Section Through Main Wall of House—Scale ⅛ in. to the foot



Main Floor Plan
Scale 3/64 in. to the foot



Front Elevation—Scale ⅛ In. to the Foot

The Bungalow We Built By the Sea—Plans, Elevations and Various Constructive Details

thing regarding the method in which I went about building the house. It was started during the vacation of the writer, who, in common with innumerable other members of the profession the past few years, must have brought much "grist" to the mills of his Satanic majesty, if there is any foundation for the belief that he it is who furnishes "mischief for the idle hands to do." I drew my plans and specifications with as much care as I should have bestowed upon them for the most exacting client. Had I carried out the usual order of things and drawn up an iron bound contract for some contractor, all would have been well, perhaps. But, laboring under the impression that, no matter what sum the contractor is getting, he is bound to make about twenty per cent out of the transaction, I calculated that not only could I build the house myself and make a neat little sum during the dull season but on top of that would own the house as well when completed. So with the assistance of two active young men I started in to surprise even myself at the amount of work I could stand and see accomplished in so short a space of time.

Soon things began to happen. First, the thermometer began to climb up to within an inch or two of the nail upon which it hung, and there was no shade on the place. Then there were several things for which no provision had been made in the specifications. The latter breathed not a word in reference to my requiring three meals a day while at work upon the building, but I did, and had to forage for them occasionally. Next, the material-man, who furnished the boards and stuff which we so cheerfully sawed up, became unaccountably interested in our work. He allowed me only a short time to wonder why. I met his rather pointed remarks with a dissertation that he afterwards admitted would have done honor to a bona fide building contractor, although it did not draw a tear or a flicker of the eyelids that I could detect. I did, however, detect a quite perceptible hardening of the muscles around the jaws of said material-man.

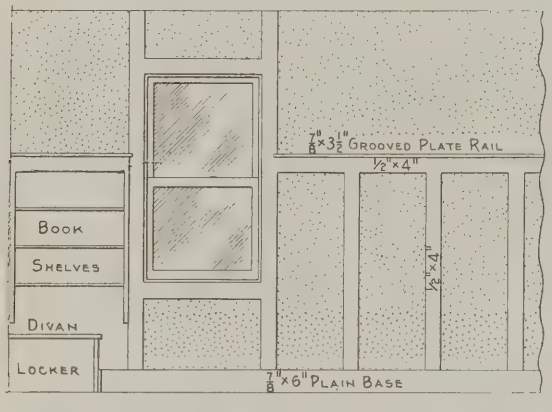
Finally I succeeded in getting the building inclosed, the first floors laid and the partitions set, before the two active young men, who made it impossible for me to return the material-man his lumber, began to accept week-end invitations from some mysterious friends. These ends must have met finally, because, after holding me up for the sums due them, they failed to purchase a return trip ticket. I felt proud of the fact, however, that they had put on all of the "plaster boards" throughout the interior before deserting me. I used "plaster boards" for the interior walls and partitions because, as I told inquirers, "masons are such untidy chaps that my artistic instincts cried out against having them around mussing things up." This was not the true reason, but was not so far fetched as some might think.

Now, then, was I in a position to show the world



The Bungalow We Built By the Sea—View in the Dining Room Looking Toward the Main Stairs

what was in me. So, doffing collar and cravat and rolling up my sleeves, I embraced the opportunity to work seventeen hours out of twenty-four and "gull" the neighbors into believing that I was doing it for recreation and getting ever so much fun out of it. A few days' work convinced me that, with the expenditure of much surplus energy, I was capable of finishing the building with my own hands, as I kept improving in skill, the amount of work accomplished in a given time, and in the evolution of the scheme and details of finish. As this brings us up to the time when I took things into my own hands and started upon the interior, I will describe the manner in which I finished the



Sectional Elevation Through Bookcase and Divan
Scale ¼ in. to the foot

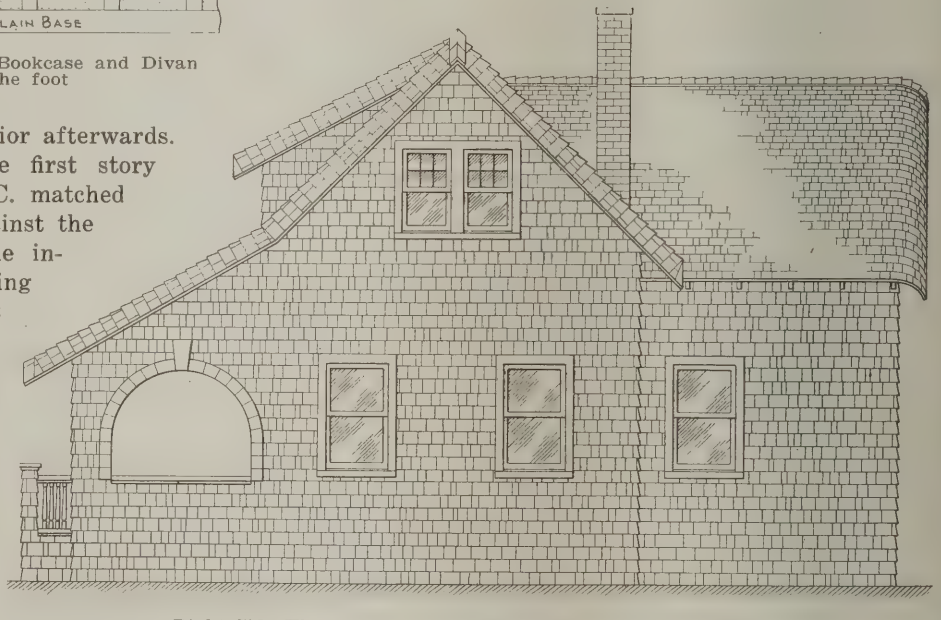
inside and describe the exterior afterwards.

The floors throughout the first story were of ⅞ in. x 3 in. N. C. matched boards, driven up closely against the outside walls, to prevent the ingress of field mice; there being no cellar under the house. At the bottoms of the studding, on top of the floor, I provided 2 in. x 4 in. pieces, cut in between the studding, to which to nail the plaster board sheets and similar pieces at heights where the sheets would join. The vertical joints I had arranged to come on the studding, behind the casings and the cross joints; two sheets in height established the distance above the floor for the plate shelf, 5 ft. 10 in. This left one cross joint exposed, which I rubbed smooth with a small block of wood and sand paper. The ceilings were 9 ft. high, to the under side of the beams above, requiring exactly three sheets of plaster boards, without waste, all around walls and partitions.

The plate shelf is simply a plain piece of ⅞ in. x 3½ in. cypress, with a groove in the top and square edges, supported upon a plain ⅝ in. x 4 in. cypress strip. Below the plate shelf, I thought to form a paneled wainscot. This I did by means of vertical strips ⅝ in. x 4 in., starting them on top of the plain ⅞ in. x 6 in. baseboard running around the rooms and finishing up under the supporting strip of the plate shelf.

Originally I had given little thought to having finished rooms in the attic above, and had placed 2 in. x 6 in. rough beams across to tie the sides of the building together. Concluding to utilize the attic space for sleeping rooms, I deemed it necessary to stiffen these timbers, which were spaced 2 ft. apart. My first thought was to double them. "I have it. Case those beams with ⅞-in. boards and have exposed ceiling beams. A timbered ceiling."

So I proceeded to joint up two ⅞ in. x 7½ in. cypress boards, and a strip of cypress ⅞ in. x 2¼ in. for each beam, and nailed them together in the form of a three-sided box, of sufficient depth and width to surround the widest and thickest beams. I got the neat lengths required and formed these boxes on a work bench on the cool, shady porch. I found that I could easily handle them alone and with little trouble put them up, averaging two an hour. I left the laying of the upper floors until after this work was completed, in order that the flooring would lay snugly down on the tops of my eased beams and require no moldings to make a finished job. Between the ends of the beams, where they rested upon the side walls and partitions, I cut in ⅞ in. boards of the depth of the finished beams, making neat close



Right Side Elevation of the House—Scale ⅛ in. to the foot

The House We Built By the Sea—L. Jerome Aimar, Architect

joints. The flooring above was of spruce ⅞ in. x 6 in. beaded and center beaded on the under side, and answers the double purpose of floor above and ceiling below.

For the trim of the window and door openings I used a plain ⅝ in. x 4 in. cypress strip, similar to the panel strips of the wainscoting. For all the openings I ran these strips up from the floor to the under sides of the ceiling beams, except that for the window openings they were cut on top of the base, while those of the door openings went by the base to the floor. I cut in similar pieces, between the uprights, to form the head casings and aprons under the windows. No stools were provided in the window openings, the window stops being returned around on top of the aprons, finishing out flush with their front edges.

My idea in using 5/8-in. stuff was that I thought it less liable to swell or shrink than thicker material and I have found that I was right in this.

With rooms above, a stairway became a necessity. This I located where shown, because there was no other properly available place to put it. It might be well for me to digress sufficiently to say that I believe about half of the clients I have ever had appeared to believe one can just plant a stairway any old place they may think they wish it. I have met more than one builder, too, who not only appeared to believe this but let themselves in for all kinds of trouble through trying to prove that the architect did not know it all. It can't be done. A certain length of base line is required for a given story height. You cannot shorten this much without producing something both uncomfortable and unsightly. A certain amount of space is required for landing on the floor above, and unless the stairs land somewhere near the center of the building it will entail much loss of floor space for hallways reaching the several rooms. In the instance of this little house, the only available base line was too short. In order to overcome this difficulty a platform was introduced and a turn at both top and bottom of the run as shown. I describe how and why this was done, for the benefit of those into whose hands the plans may come, and who might feel justified in saying to their builder, "I don't like a turn in my stairs, just you run them straight up."

The width of the stairway formed a jog in the front line of the rooms, and by carrying this jog over into the living room I thus formed a square bay in that apartment, without breaking the lines on the outside. In doing this the little vestibule was evolved, which I consider one of my best "stunts," for by providing this vestibule, I could lower the ceiling in it and make it serve as a platform for the stairs, so that every inch of space was utilized, making it unnecessary that an unsightly "storm door" grace my porch in winter. In the summer time I take down the glazed doors and substitute a wired one.

In the square bay before mentioned, a long seat became possible, which I made extra wide, and being so long I cut it in two through the center of its length and hinged each half. What a commodious locker this seat provided. And how soon it became the repository for old magazines and "junk," just as I predicted it would when I built it.



View in Living Room of the Bungalow We Built By the Sea, Showing the Open Fireplace with the Dining Room Seen at the Right

In the corners of the bay, each side of the mullioned window, small book shelves suggested themselves, and a few short pieces of 7/8-in. stuff left over from the beam casings, provided the materials. One of these book shelves is shown in the picture, with its top forming a continuation of the plate shelf, upon which you may perhaps note a model of a picturesque cottage, worked out to scale for an appreciative client.

Up to this point I had succeeded in staving off the masons, but when I reached the fireplace I approached the subject with fear and trembling, so I felt obliged to capitulate and call in one to build the chimney. I believe that I could have built it,

but there is something about masons' work that, throughout my many years of practice, has led me to make a considerable detour when within the vicinity of a mortar bed and to treat very courteously "the man with the hoe."

I drew a detail of the fireplace as I desired it built. When, in answer to my mason's inquiry whether I intended using Mottled Roman or pressed bricks, I informed him that I thought to use just such bricks as he had used for the foundation for the house down the street, he gasped:

"You never expect a man to do a job like this with such brick?"

"Why not," I replied. "It is the manner in which I expect you to lay up the bricks that makes the finished design conform with the drawing."

"Many of those bricks have their corners grained, will do first rate; it will give the cement mortar a creamy cast, which I think I will like."

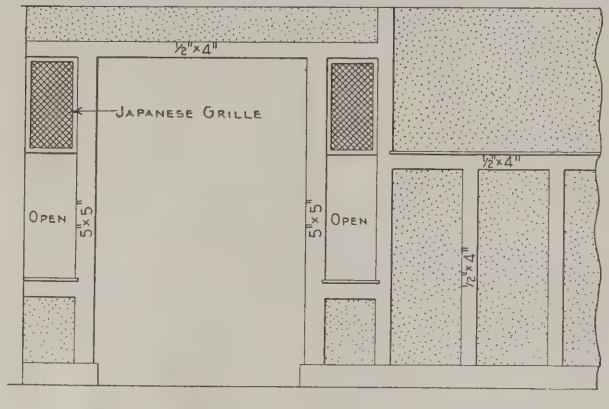
"Oh, werry well, Governor; you are the boss, but don't expect me to stay and hold that chimney up—if I can ever get it to stand up until I finish it."

After starting and threatening to "chuck up the job" several times, he finally managed to complete it after a fashion. When I had more leisure I dug the mortar out around the edges of each brick with a tool not intended for such purpose.

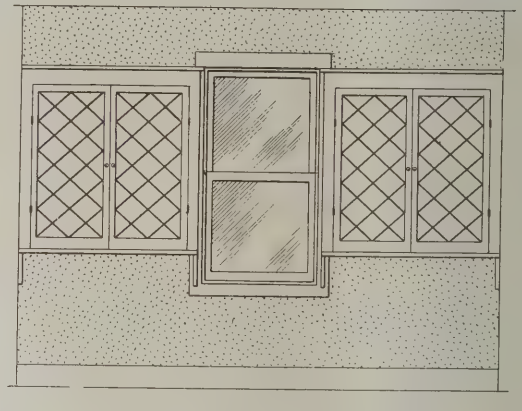
The following winter he found me sitting before a comfortable wood fire, and was struck with the changes I had worked upon his job.

"Stick your teeth in that mortar, and I will tell you how I did it."

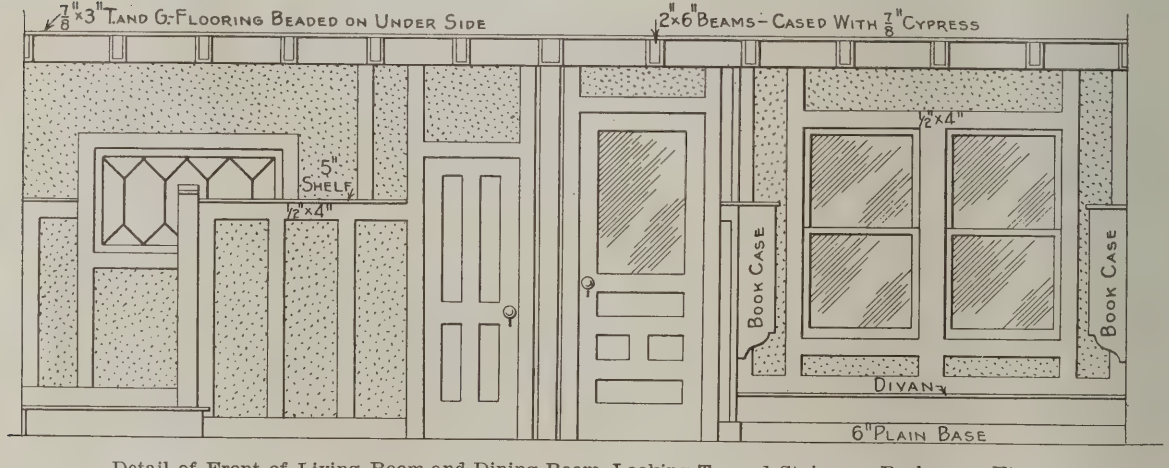
He dug into it with his pocket knife and laughed, "Well you had some job, believe me."



Opening Between Living and Dining Rooms



Elevation of China Closets in Kitchen



Detail of Front of Living Room and Dining Room, Looking Toward Stairway, Bookcases, Etc.

The Bungalow We Built By the Sea—Miscellaneous Constructive Details—Scale ¼ In. to the Foot

knocked off," he came back. "I will have to use selected bricks for such a job."

"Suppose I were to insist that you use those very same bricks and to lay them up as I will direct and that I will assume the entire responsibility regarding the outcome, do you think I might prevail upon you to do the job?"

This he finally agreed to do, but when I required an inch and a quarter mortar joint I heard him mutter to his assistant, "Some of these here now archeetexes is just plum crazy."

He insisted upon laying up "flush" joints, and I finally had to let him. For mortar he wanted a load of some special sand.

"That sand we have outside, while a trifle fine

The next trouble was with the painter, who laid out an elaborate scheme for finishing the woodwork.

"No you don't," I cautioned; "now, listen: This is to be a little home that people in very modest circumstances can set about building themselves. It is not to be an elegant mansion at all. What I wish you to do for me is to tint some putty to match this piece of cigar box, neatly putty up the nail holes and the poorest of 'my' bad joints, then sandpaper every part smoothly; brush on some brown stain, diluted with 'turps' and then rub it down painstakingly. I realize how you feel about it, Sonny, but that will be about all I desire."

Well this he did, and I showed him the "pictures" the other day, and he realized that the bringing out

of the lights and shadows was all that was required to make it beautiful. Understand, all along I kept in mind my idea to complete an artistic home, such as anyone desirous of getting away from the commonplace stock designs might afford to build.

I must now accustom myself to saying "we," because my wife thought it about time she took a hand in the game. Of course few would think of going about such a vital matter without consulting an expert and spending days in evolving a color scheme. Not intending to buy a single stick of new furniture to go into this house and possessing just a limited lot of odds and ends, we could afford to throw conventionalities to the winds, rather than our money—which we had not.

Well, after much comparing of notes, we could not convince ourselves that anything would suit for the lower, paneled portions of the walls but some shade of green. We finally chose a shade of that color in burlap, but, finding that so many were using this material for wall covering, we lost our interest in it. What we did use was an "oatmeal" paper, which we decided was just as beautiful and more in line with our set scheme of economy.

For the side walls above the plate shelf we used a yellowish gray paper with alternating strips of a darker shade and a border.

The kitchen walls we covered with a washable paper. The attic bed rooms with neat patterns of ribbon paper, the vertical stripes making the ceilings appear higher than they really are. The woodwork throughout the attic was given three coats of "flat" white, sandpapering all between the coats. About two coats more will give it the finish we are aiming for.

I was somewhat extravagant in the items of "flue lining" for our chimney. So, in punishment, "she" keeps the fact before our eyes in the manner shown in the view of the fireplace.

Please take a glance at our "andirons," or, as they are called where we passed our childhood days, "dog irons." But these are neither. Look a little bit closer, and you will see that they are nothing more nor less than part of the "footpiece" of a child's crib.

A little thought—a couple of hours' work—resulted in the really useful accessory shown. And, some day, we are going to have a copper "hood" over the fireplace opening.

I think I have mentioned that there was no cellar under this house. I would advise having a cellar, and expect some day to excavate one under this house, in which case access to same from the floor above will be by stairway through the closet under the present stairway to attic rooms.



The Bungalow We Built By the Sea—View in Living Room Looking Toward the Divan

This house was set on a low concrete trench wall, which raised the timber sills two or three inches above the ground. The timbers were all of hemlock, the sills being 4 in. x 6 in.; corner posts, 4 in. x 6 in.; plates, 2 in. x 4 in., doubled; floor beams, 2 in. x 6 in.; girder, 4 in. x 6 in.; rafters, 2 in. x 6 in.; piaza timbers, 2 in. x 6 in., all fitted and fastened together in proper manner.

Anticipating the future possibility of there being a cellar, the posts and exterior studding were not carried down to the sills in the usual manner. These

sills, resting upon the dwarf walls, are much below the first floor level, so short pieces for uprights were set up from the sills to the under sides of the floor beams, and the beams were cut 8 in. shorter than the actual width of the building, and similar 2-in. x 6-in. timbers were spiked against their ends, these timbers being doubled, thus forming 4-in. x 6-in. sills on the long sides of the building. The end beams were doubled, making them 4 in. x 6 in. Upon these timbers the studding and corner posts were set, though the sheathing was started from the lower sills, just above the ground.

When the cellar is put under the house all that is necessary is to knock out the short uprights and sheathing and carry the masonry walls up to the level of the higher timbers.

Covering for Exterior Walls

The exterior walls were sheathed horizontally with ⅞-in. x 9½-in. North Carolina shiplap boards covered with heavy building paper and inclosed with 18-in. Western red cedar shingles of promiscuous widths laid in courses, exposing 6 in. to the weather. The roofs were covered with similar shingles laid 5½ in. to the weather and laid on 1-in. x 2-in. spruce strips, set to accommodate the shingled courses. The roof over the piazza was sheathed on top of the rafters with ⅞-in. matched and center-beaded North Carolina boards, the rafters being left exposed and rough.

The overhangs at eaves and gables were formed in a simple manner, as shown, and at no greater cost than the usual commonplace box cornice. Shingling over the "rolled" projection necessitated no extra manipulating of the shingles after the double ease courses were laid and the single "drop" course shown on the ends next the eave course. Using somewhat narrow shingles, they laid as flatly and easily over the curve as upon other parts of the roof; ⅞-in. x 3-in. matched North Carolina boards were turned over the curved "lookouts" in the gables, and upon these the roof shingles were laid. These "lookouts" were short pieces of 2-in. x 6-in. cut off the ends of the floor timbers, being lined out and shaped with a sharp shingling hatchet. Masons laths were laid under the shingles, where they were laid over the tight sheathing on the piazza roof, to provide ventilation under them.

The Piazza Construction

The piazza flooring was of ⅞-in. matched North Carolina pine (white pine would have been preferable) laid in white lead. The arches of front and ends were sheathed in similar manner to the other parts of the building, and the shingled courses continued over to same and cut to the required radii. A row of shingles was then laid around the outside of the arches over the regular courses as shown—a simple and effective treatment. The soffits of the arches and the interior sides of the inclosure were ceiled with ⅝-in. x 3½-in. matched and center-beaded North Carolina pine, with small plain fillet broken in the angles.

All exposed rafter feet were left rough and of their full depths. To dress them would have reduced their dimensions, while to paint them rough gave a more "weathered" appearance, in keeping with the general character of the design.

All shingles were left to "weather stain." Not that "be-u-ti-ful" silvery gray of which we have heard so much, but have never yet seen materialize, but an equally beautiful "wine" color of metallic luster—under some weather conditions and at other times a very pleasing shade of brown. All shadowed overhangs were stained a brown to emphasize the shadows.

In the kitchen, each side of the end window, we have set up what we term "china cupboards," and under the one farther from the sink we have provided a wide counter shelf, open underneath.

We have a driven well, which is nothing more than a 1½-in. galvanized iron pipe driven down through a gravel strata 14 ft. below the surface. This was a heart-breaking job but well worth the pains it cost. We put in an ordinary pitcher pump, which we will some day replace with a lift pump. An enameled iron, roll-rim sink is placed about where shown on the plans, and the window put in the center of the side instead of where shown.

The Pantry Arrangement

The pantry is provided with shelves and has ample space for our refrigerator, etc. Where the roof slopes down over the pantry, makinig the ceiling too low for use, we have run a partition across about 3 ft. from the rear wall and thus provided a coal bin, with a hinged shutter on the outside, up under the eaves. We have also a slide arrangement, by means of which we can get our coal through the pantry. A shelf in the coal bin with a slide opening in the pantry allows us to keep our oil can outside and yet accessible from indoors.

The bathroom is located over the kitchen, the fixtures consisting of a 5-ft. enamel-lined tub with 3-in. roll rim, an enameled iron lavatory and a porcelain closet with low enameled iron tank.

The house is piped for gas, and we have a gas stove in the kitchen, besides our coal range. We are out of range of the sewer system at present, as well as city water. Otherwise there is little left to be desired, unless it might be less frequent visits of the tax collector or the possibility of meeting our grocer and butcher with more mutual satisfaction.

And what did all this cost, ask you? Well, we crawled out from under with an expenditure of fifteen hundred dollars. This price of course does not include such "frills" as our andirons.

The Panama-Pacific Exposition Buildings Go to Oakland Wreckers

A considerable number of the Panama Exposition buildings which were recently sold, were purchased by the Dolan Bros. Wrecking Company of Oakland, Cal., with the understanding that the sites must be cleared by March 15 of the present year. The buildings involved are those of the States of Massachusetts, Illinois, Texas, Wisconsin, West Virginia, New Jersey and Kansas, also the Panama Canal Building, Yellowstone Park, Old Faithful Inn, Alt Nurnberg, Canadian Grand Trunk Railroad and hundreds of exhibit booths. The wreckers claim to have purchased about 50,000,000 ft. of lumber and invested about $25,000.

Bell Tower and Ventilator Details

An Example of English Practice That May Be of Possible Interest to American Builders

BUILDING methods differ in many essential particulars in various parts of the world, and it is always interesting to note how work is done in sections remote to that in which one may live. Many readers are likely therefore to find points of construction to command their attention in the account of an English builder telling in the *Building World* how to make a ventilator and a bell tower for use upon a school building. According to the author the base or framing is fixed on the main roof of the building, the ventilator being afterward set immediately upon the base. The top space is intended to be occupied by the bell and is provided with a roof formed in four gables, the whole being surmounted by a wrought-iron weather vane of ornamental design.

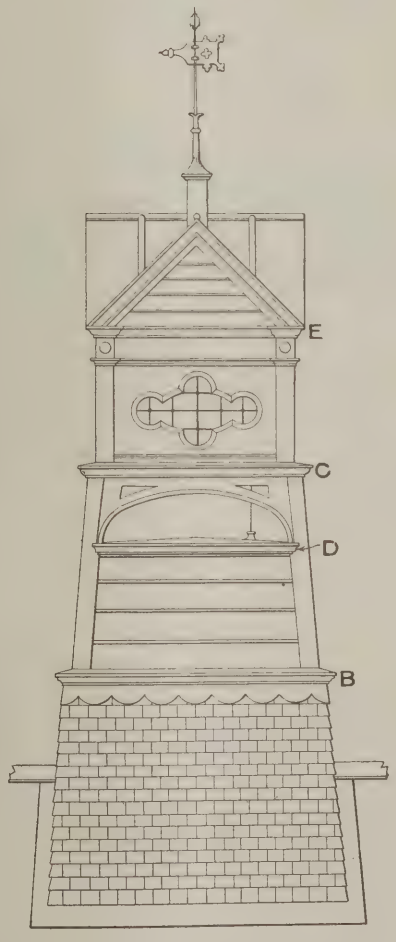


Fig. 1—Elevation of the Bell Tower

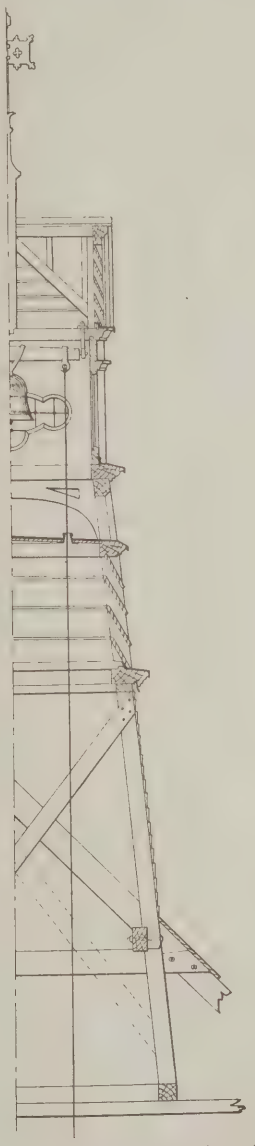


Fig. 2—Vertical Section of Tower to a Somewhat Larger Scale Than the Elevation

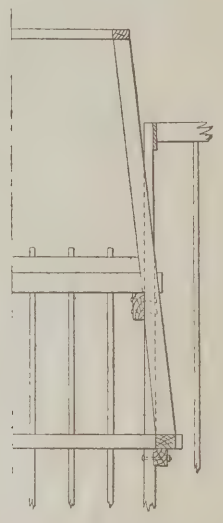


Fig. 3—Partial Vertical Section on Line A-A of Fig. 4

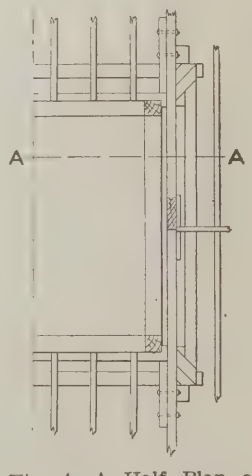


Fig. 4—A Half Plan of the base

Bell Tower and Ventilator Details—Various Constructive Features

The construction of the turret, of which Fig. 1 shows the elevation, is best understood by reference to Fig. 2. The angle-posts of the base are formed from 4-in. by 4-in. pitchpine, with a 4-in. by 3-in sill framed at the angles. The raking braces should be halved to the angle-posts and spiked, and seating pieces, 5 in. by 4 in., bolted to the collars and posts.

Where the turret is being fitted on an old school building, trusses should be inserted in the roof to sustain the weight and to form supports to which the corner posts can be bolted.

The ventilating portion of the turret is formed with louvers of 1-in. oak board grooved into the sides of the angle-posts. The covering of the ventilator is of 7-lb. lead laid on properly weathered joists and boarding; it projects over, and is turned

down on the cornice. The bell chamber is provided with leaded lights on all sides, the bell itself being hung on a pitchpine beam, with wrought-iron gudgeons, bell-metal bearings, and a wrought-iron cranked arm for the rope.

The roof over the bell is covered with 7-lb. sheet lead, divided into small bays with 1-in. roll, the gables being filled with 1-in. oak louvers. The wrought-iron vane is bolted through a 4-in. by 4-in. oak post fixed to the turret roof by means of cross bearers passing over the bell beam.

The sections are fixed together with strapped bolts. Fig. 3 shows a half vertical section on the line *A A* of Fig. 4, which represents a half-plan

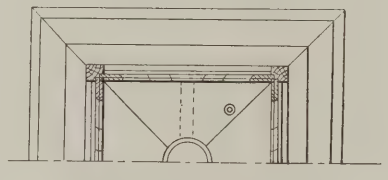


Fig. 5—Half Plan of the Tower

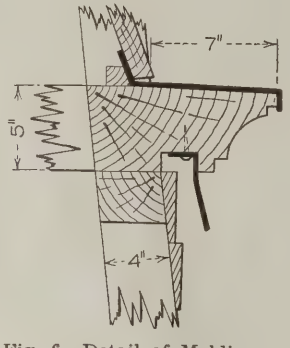


Fig. 6—Detail of Molding at "B" of Fig. 1

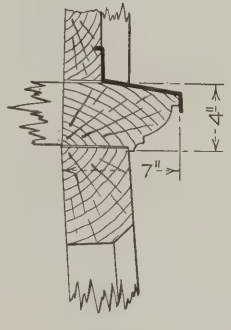


Fig. 7—Detail of Molding at "C" of Fig. 1

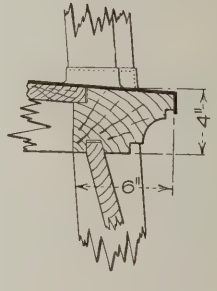


Fig. 8—Detail of Cornice at "D" in Fig. 1

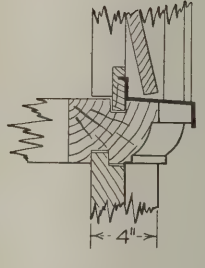


Fig. 9—Detail of Cornice at "E" in Fig. 1

Bell Tower and Ventilator Details

of the base; Fig. 5 shows a half-plan of the bell-tower chamber.

Details of the projecting cornices are shown in Figs. 6, 7, 8 and 9 of the sketches.

Fire Losses in 1915

The losses by fire in the United States and Canada during the year 1915, as compiled from the records of the *Journal of Commerce*, aggregated $182,836,200, as compared with $235,591,350 in 1914. The fire loss record for 1915 is the smallest the country has enjoyed since 1905, when the figures recorded were $175,193,800.

The Material Dealers' Credit Association, of Fresno, Cal., held a banquet on the evening of Jan. 24 at Hotel Fresno, celebrating the end of the first six months of its existence. The guests of honor were L. W. Cutler, an insurance man, who spoke on "Bonds," and H. B. Potter, president of the Los Angeles Building Material Dealers' Association, who spoke on "Co-operation." The association now has over fifty members.

A Log Cabin on Mount Hood

There has recently been completed on the summit of Mount Hood, by the United States Forest Service, a log cabin 10 x 12 ft. in size and 17 ft. high, which is to be used as an observatory. Its construction is somewhat interesting, both on account of the difficulties with which the material was transported to the top of the mountain and on account of the fact that it is the highest fire outlook station in the United States, having an elevation above sea level of 11,225 ft.

For most of the distance up the mountain the lumber was carried in packs by mules, but between Crater Rock and the summit the path rises almost 1000 ft. in less than a half mile, and is blocked by crevasses and hanging rocks. One crevasse, 20 ft. wide, had to be crossed on a frail ladder. Directly beyond this crevasse the ascent is so steep that the packers had to cling to a rope to pull themselves up. The lumber was cut into lengths of from three to eight feet, tied into bundles of 75 lb. each and the 5000 ft. of lumber necessary for the cabin were thus carried up the mountain side over rolling lava stone and snow and ice.

Because the wind at the top often reached a velocity of 75 miles an hour the foundation was sunk to 4 ft. and the cabin was anchored by cables extending from the top of the cabin to cement bases. The success of establishing this station has induced the forest service to plan two similar stations on the summits of Mount Adams and Mount St. Helena, thus forming a triangle, from the angles of which all the forests of central Washington and Oregon may be observed.

Marble from Alaska

Marble from Alaska is to a large extent replacing this class of building stone from other quarters in the Pacific States. Large quantities are now being used in the construction of the King County Court House and the American Securities Building, Seattle, and a new postoffice at Everett, Wash. Marble from the large quarries at Tokeen, Alaska, is towed down the coast on barges, a load of 1400 tons having recently arrived at Seattle.

More "Wrinkles" in House Building

Various "Short-Cuts" for Doing Work Which the Younger Carpenters in Country Towns Will Find Useful

By George L. McMurphy

ABOUT the first thing the carpenter requires when he goes to work on a job is a pair of trestles or "saw horses." As there are likely to be several used on a job, it is quite desirable they should be built to standard height, so they will be interchangeable for different kinds of work as needed. I have found that for ordinary use on residence work 2 x 4 in. stuff for tops and 1 x 6 in. for legs make them heavy enough for all practical purposes, and much more convenient to move about than if made heavier. The most convenient height and size I have found to be 3½ ft. hold bradawls or spiral drills and similar tools when putting on finish.

Much of the present day practice is to mitre siding (clapboards) at the corners instead of using corner boards. It certainly makes a neat looking job when well done, but may puzzle some of the more inexperienced workmen at first to find an easy way to make the cuts. I have found that a piece of the siding tacked against the inside of the mitre-box will make the proper bevel and help greatly in making the cuts. We use cedar siding here, made by re-sawing 1 x 4 in. or 1 x 6 in. boards after they

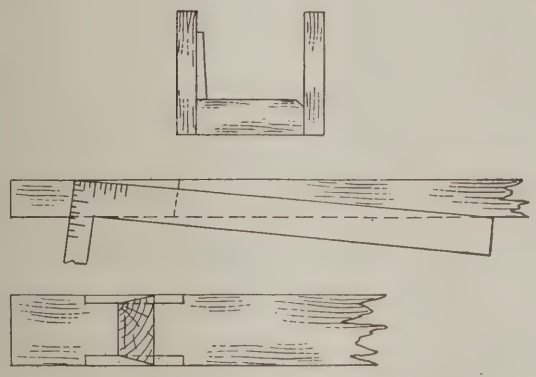


Fig. 1—Details of Trestle or "Saw-Horse"

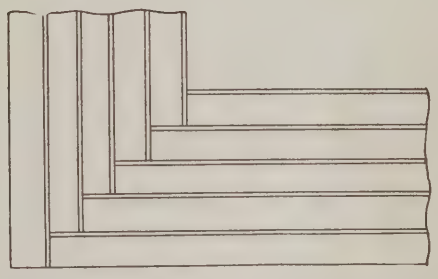


Fig. 3—Joint Construction Suggested When Laying a Floor or Putting Up Porch Ceiling.

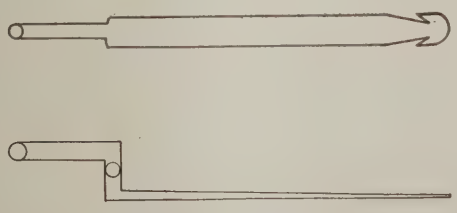


Fig. 2—Plan and Side Views of Tool for Removing Nails

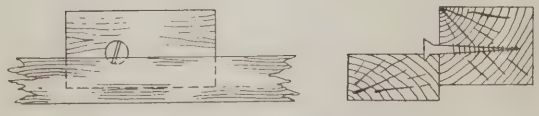


Fig. 4—A Make-Shift Bead Plane

More "Wrinkles" in House Building as Described By Mr. McMurphy

or 4 ft. long and made as follows: Take a piece of 2 x 4 about 3½ ft. long and cut 6 in. gains on each side 4 in. from each end, making them ½ in. deep on top and tapering to the edge below, as shown in Fig. 1. Making the bevel across the 2 x 4 2 in. in 2 ft. as shown. Cut the legs the same bevel and just the length of the square, or 2 ft., and the trestles will be about the right height for most men. A 1 x 8 board nailed across the legs close to the top will brace them and the bevel in the gains will give the right spread to them. Two or more holes bored through the top in which long pins may be put will be found very convenient when mitreing base or making similar cuts, as well as to have been dressed. They are re-sawed on a bevel and vary quite a little in thickness,—not enough to be noticeable on the wall but enough to give some trouble at the corners unless care is taken to either select those of even thickness or dress them as they are put on. I like the practice of nailing siding with 4d.—½ in.—casing nails, placing them at random rather than using 6d. nails and following the studs. The nails will pull through the siding before they will pull out of the sheathing. There is very little tendency to warp in cedar siding, but I used 4d. common nails with good success on "machine clapboards" of spruce in Vermont before I left the Green Mountain State some years ago.

It is a good plan to space the siding on a rod long enough to reach at least one story if not the whole height of the building, and use the rod at each corner as well as at windows and doors. The time spent in marking the rod will be more than saved in the time otherwise required at each corner and window, to say nothing of the added satisfaction in having the lines straight all around the building, and preventing mistakes and wrong spacing as is likely to be the case where several men are spacing independently. I have known a man to lay off two adjoining spaces between windows and get one more piece of siding in one space than in the other where each space was done independently.

Staging a Building

Another thing in which often too little foresight is displayed is in staging a building. We hardly ever use portable brackets here, but 2 x 3 or 2 x 4-in. stuff for uprights and nailing ledges to the building. If a little forethought is exercised the stagings can as easily be built so that the top one will be right for putting on the cornice and starting the shingling and siding, as otherwise, yet I have seen men stage a whole house so carelessly that when it was sheathed every stage had to be rebuilt before it could be used for either cornice or siding. Also get the habit of always nailing the ledges and stays securely before they are left, otherwise they may be forgotten and a bad fall with serious injury or loss of life may result.

Sometimes we are called on to patch an old roof or to put up an addition where the roof joints below an old one, in which case the task of getting rid of nails under the shingles which are not to be removed is somewhat troublesome. A tool shaped somewhat like an old-fashioned bayonet with the blade made of a thin piece of steel like a leaf from an elliptic spring will be found useful. The sketch, Fig. 2, will explain what I mean. The notches should be made rather sharp and have a "cold chisel temper" that they may cut or pull the nails. If in putting in patches or the top course below an old roof, the shingle is shoved up to within ¼ in. of where it belongs and the nails driven close up to the butts of the course above and not too tight, the shingle can then be driven home and will draw the nail heads up under the shingle above, thus hiding them and making a much neater job.

Floor and Ceiling Joint Construction

Where the cornice plancier is of 1 x 4-in. ceiling, or in turning a corner with porch ceiling, or laying a floor border around a room, it is better to make a "zig-zag" joint, as in Fig. 3, than to mitre the boards. Such a joint will "stay put" better and is easier to make than a mitred one, which is almost sure to shrink or swell and open. I much prefer a square joint to a mitred one wherever it can be used, and in my own practice use such a joint where many prefer the mitre cut. For instance, in such places as joining base or moldings, casing around registers, where they are set in the wall, etc., I think a square joint that *stays* is much preferable to a mitred one that has opened ever so little, and it is very rarely that a mitred joint will stay in ordinary work, especially out of doors.

In years gone by every carpenter carried with him on to the job a chest full of tools, including a supply of bead planes of various sizes, but in these days of "suit case" kits even a Stanley "55" adds materially to the workman's load. Yet it is often necessary for him, especially on repair jobs, to work a bead to match some old work, and the absence of a bead plane of the right size is a great inconvenience. Here is a simple way to overcome the difficulty that is worth knowing. Take a block and drive a large headed wood screw into the side of it till it projects the right distance to make the right sized bead, as in Fig. 4. Turn the screw till the slot presents a cutting edge, as shown, and the groove of the bead can be made with little difficulty. The sharp corner can be easily rounded off with the smoothing plane and a little application of sandpaper will show a presentable bead that will pass muster on almost any job. Of course, this is not as satisfactory as to have a regular bead plane, but it is a convenient makeshift to tide one over a hump when caught without just the necessary tool.

Doing Mill Work on the Job

Sometimes the carpenter does much of what is commonly known as "mill work" on the job, and sometimes he does cabinet work when other work is dull, or where no regular cabinet shop is near. In such cases he is sometimes required to glue up a mitred corner and finds it difficult to clamp the two pieces together while the glue is setting. Fig. 5 shows an easy way to overcome the difficulty, and is almost self-explanatory. The blocks "A" are dressed to the proper angle so that when glued on the faces will be parallel with the faces of the joint, and glued just back of the edge as shown. When the glue has set and the clamps applied the joint can be brought firmly together and held while the glue is drying, after which the blocks can easily be dressed off. If hot glue is used the blocks can be "rubbed on," but if liquid glue is used it may be necessary to tack them slightly to hold them in place till the glue sets.

Lock Joint for Mitered Corners

Fig. 6 shows a lock joint for mitred corners that I consider much superior to a plain mitre. It offers more surface for the glue and if well made will hold with some force without glue. In main newel posts and similar work clamps need only be applied one way, saving half the number otherwise required, and where the boards are a little crooked, as is almost always the case, they will straighten themselves when clamped together. The joint should be made a little open, and with a little "draw" to it as shown. Where machinery is available the joint can readily be run on the shaper or jointer, but where no such advantages are at hand planes to stick the joint can be made at small expense, and where there is much work of this kind to be done they will be a profitable investment.

Where pantry fixtures or cabinet work are made by hand, dowels are largely taking the place of the mortise and tenon, and I think that way is fully as good, being as strong as well as more quickly and easily done. Where that kind of work is done it will be found that an old bitt with the spurs filed off smooth and sharpened will work better for boring into end wood than even a new bit with the spurs

sharp. Almost every workman has several such bits thrown aside as useless from the spurs having become so worn down that they will no longer cut a smooth hole for ordinary work, but which will be found to have "renewed their youth" for this purpose if treated as above.

Also let me suggest to the inexperienced workman that in making panelled work or glass doors, that the mortises and tenons should be worked and the dowel holes bored before the stiles and rails are plowed or rebated. Where glass doors or sash are being made allow ⅛ in. more than the glass size in laying out the work, and make panels 1/16 or ⅛ in. smaller than the surrounding frame, allowing for the groove to provide for swelling or shrinkage of the wood. Panels should never be glued in as there is almost certain to be more or less shrinkage or swelling of them, and if glued they will be apt to split, thus spoiling the work.

Many times the carpenter is required to put up the rough strings for stairs, even when the finish stairs are made at the mill, or by a stair builder. Sometimes one man will put up the strings and another will finish the stairs. As the rough strings will almost always shrink a little it is usually difficult to determine from measuring the strings just what figures were used in cutting them, and as a small variation from the figures will make a considerable difference in the length of the flight, I have found it a great convenience when working after another man in such cases to have the width of risers and trends marked on the side of the rough string for the benefit of the man who may follow.

With apologies to Morris Williams, whose province I have no intention of invading, I venture to illustrate in Fig. 7 a simple and convenient way of laying out winders where it is necessary to make a turn and there is not room enough to permit of the use of a platform, no stair-builder being employed.

Fig. 7 is the plan of such a stair. From the center *e* with any convenient radius strike the arc *a d c b*. From *a* as center with the same radius cut the arc at *c*, and from *b* as center cut it at *d;* then from *e* through *c* and *d* draw lines as shown, which will give the position of the risers for three winders —the number most commonly used. A way by which a pattern can be made from which to cut the tread for the middle step is shown. The pattern can be made of any light stuff with one straight edge, and with care can be made accurate enough so that the tread can be cut by it to make a good fit. It should be braced as shown to prevent its getting out of shape in moving from the strings to the plank. The other steps can be similarly cut.

While the custom of putting thresholds under doors has mostly gone out of use except under outside doors it is well for one to know how in case it may be desirable to do the work. My method, which I have rarely seen other workmen use, is rapid, easy, and if carefully followed, will insure a perfect job, so I venture to describe it, though it would be much easier to *show* how than to *tell* how.

Lay the threshold across the doorway against the plinth blocks, as in Fig. 8. Take a straight rule (the slide from a Starrett try-square is excellent for the purpose), place it against the face of the jamb, as shown, and mark on the threshold the line *f b* for the cut against the jamb face. Measure the

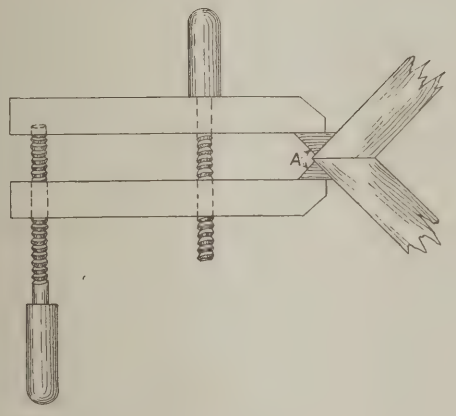


Fig. 5—A Method of Clamping Work

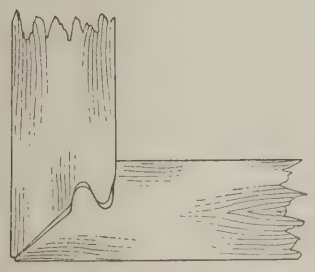


Fig. 6—Lock Joint for Mitered Corners

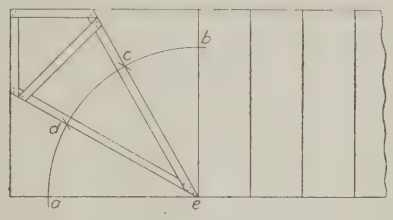


Fig. 7—Simple Method of Laying Out "Winders" in Stair Construction

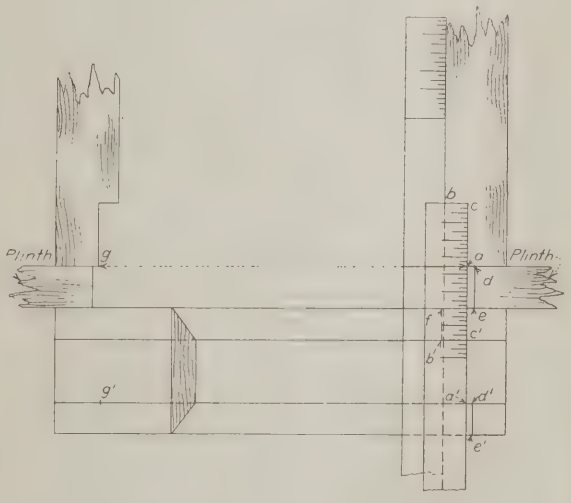


Fig. 8—Method of Constructing Thresholds

More "Wrinkles" in House Building as Described By George L. McMurphy

depth of the rebate *b c* and lay it off on the threshold at *b' c'*. Place the rule against the face of the rebate, as shown, and slide the threshold until the point *c'* comes to the edge of the rule and mark *c' a'* for the cut against the rebate. Find the cut against the plinth in the same way. This will give the cut for one end of the threshold with bevels and distances correct. Measure the width of the opening *a g* and lay it off on the threshold at *a' g'* and repeat the process for getting the cuts and bevels for the first end. This is called "tumbling" them in, and if carefully done will be found quite rapid, and will insure a good fit. It is especially useful where jambs and rebates are not square with line of partition.

Some of the methods here described may seem so simple that to the city mechanic they may not seem worth the space used in describing them. I know, however, there are many workmen in country towns who have slight opportunity to learn the "short cuts" and ways of city workmen, and I have written these suggestions in the hope that they may be useful to such men.

Meeting of Iowa Master Builders' Association

The members of the Master Builders' Association of Iowa held their annual convention in January in Des Moines and adopted resolutions which were of vital interest to those associated with the building and allied industries. Practically every city and town of importance in the State was represented, and some of the larger cities sent a number of delegates. The meeting was opened by an address of welcome by Lieutenant-Governor William L. Harding, who was followed by various speakers, including J. A. Gunn, president of the Employers' Mutual Casualty Association, George A. Wrightman, secretary and treasurer of the Iowa State Manufacturers' Association, and G. A. Rippey, president of the Des Moines Law Club.

"Boost for Iowa All the Time" was the slogan adopted for contractors, architects, manufacturers and materialmen. A Legislative Committee was appointed to co-operate with a like committee of property owners and attorneys to point out conflicting and confusing sections now existing in the lien laws and to frame a bill to be presented at the next session of the Legislature repealing the objectionable features.

A firm stand was taken on the adoption and use of the "Standard Form of Contract Documents," which was in line with the resolution adopted by the Iowa architects at their State meeting last October. A resolution was also adopted to refuse to submit certified checks with bids for private work. The publication and circulation of the Iowa Master Builders' Year Book was endorsed. Officers for the ensuing year were elected as follows:

President.....H. A. Maine of Waterloo
Vice-President.....J. J. Logan of Clinton
Treasurer..John A. Benson of Des Moines
Secretary....J. C. Loomis of Cedar Rapids
Gen. Sec.....C. P. Massard of Des Moines

C. A. Dubel of Sioux City, the retiring president, and C. P. Massard of Des Moines, the general secretary, were appointed delegates to represent Iowa at the Baltimore Convention of the National Association of Builders' Exchanges.

Reports submitted by officers of the association showed 1915 to have been the best year in the history of the organization, both as regards membership and finance.

Meeting of N. C. Builders' Exchange

The annual convention of the Builders' Exchange of North Carolina was held in Greensboro, N. C., on Jan. 18 and 19. The attendance represented one of the largest gatherings of building contractors and material men in the history of the organization. It had been announced that the slogan of the convention would be "Prepare for Prosperity," and this spirit of optimism pervaded all the business sessions of the meeting.

The first day was taken up for the most part with meetings of the various committees of the exchange. On the evening of that day a most enjoyable "smoker" was tended the members of the organization by the contractors and builders of the city of Greensboro. This was held at the Elks' Home on Sycamore Street, and was in reality a Dutch luncheon and a get-together meeting combined. It excellently accomplished its purpose, which was mainly to make every visitor feel at home.

The business meetings were held on the second day, there being three sessions. The deliberations were presided over by President J. T. Salamon of Durham. Among the topics discussed were "The Outlook for 1916," by F. S. Chavannes of Baltimore, Md., "Financial Problems of the Building Business," by J. D. Wilkin of Greensboro, N. C., "A Plan to Increase the Membership of the Exchange," by T. G. Redden, and "Glass and Glazing," by P. W. Eishelman of High Point, N. C. The officers elected for the ensuing year were:

President.....Joe W. Stout of Sanford, N. C.
First Vice-President....J. R. McClamroch of Greensboro, N. C.
Second Vice-President.....E. D. Tessier of Greensboro, N. C.
Treasurer.....L. G. Berry of Charlotte, N. C.
Secretary.....Philip Williams of Winston-Salem, N. C.
Traffic Manager.....J. R. Burch of Greensboro, N. C.
Attorney.....Philip Williams of Winston-Salem, N. C.

It was decided to hold the semi-annual convention of the exchange in June at Wrightsville Beach, N. C., and the next annual convention in January, 1917, in Raleigh, N. C.

The convention closed with a banquet held on the evening of the last day at the McAdoo Hotel.

The new clubhouse for the Friars now in course of construction in West Forty-eighth Street, New York City, is estimated by the architect, Harry Allen Jacobs, to cost approximately $400,000. It will be, when ready for occupancy, a handsome structure in Gothic style of architecture adapted to modern conditions.



A Dutch Colonial House on Long Island, New York

A Good Example of the Domestic Architecture of the Time of Our Forefathers—Some Details of Interest to the Builder

THOSE of our readers who are interested in colonial architecture will find much to command their attention in the layout of the suburban home which we illustrate herewith. The rambling roof with its dormer windows, the broad veranda extending entirely across the front with the pergola at the side, the swell of the dining room and the solarium with sleeping balcony above are some of the noticeable features of the design.

The foundations rest upon footings 8 in. deep and projecting 6 in. beyond the walls on both sides. The foundations are of hollow blocks 12 in. thick laid in cement mortar composed of 1 part Portland cement and 4 parts sharp sand.

The building is of frame construction, all timbers being of spruce. The sills are 4 x 6 in., the girders 6 x 6 and 8 x 8 in., the first and second floor joists 2 x 10 in., and the third floor joists 2 x 8 in., all placed 16 in. on centers, except the second floor beams over the living and dining room, which are placed 12 in. on centers, the studs 2 x 4 in., the rafters 2 x 6 in., and the floor joist of the porch deck 2 x 8 in. The sills are halved together and spiked at the corners and junction points. They are supported on Acme columns with iron caps and bases. The floor beams are doubled under partitions and around openings for stairs, chimneys, etc. All openings more than 4 ft. wide are trussed.

The exterior walls of the house are covered with ⅞ x 6 in. spruce boards laid diagonally, over which is a layer of heavy building paper. This in turn is covered with ⅞ x 10 in. white pine clapboards or siding exposed 9 in. to the weather.

The rafters of all sloping roofs carry 1 x 2 in. shingle strips, on which are laid 16-in. white cedar shingles, exposed 4 in. to the weather. Before laying, the shingles were dipped in Cabot's moss green shingle stain.

All outside finish is of No. 1 cypress and the porch is ceiled with strips of ⅞ x 2½ in. cypress. The porch columns are of Koll's lock joint type, made by Hartmann-Sanders Company, Chicago, Ill.

The sash of double hung windows is of ⅜-in. white pine and the French windows are 1¾ in. rabbetted.

The plastering is of two-coat work finished with a white coat of King's Windsor cement. The bathroom and kitchen are also plastered and finished with a coating of Keene's white cement laid up in 3 x 6-in. sections to represent tile. Metal corners are used in all exposed openings.

The floors are double, the sub-floor being of ⅞ x 6-in. spruce with a finish floor of parquette design in all the rooms in the first story except the kitchen and pantry. The finish floors in the rooms of the second and third stories are of ⅞ x 2½ in. North Carolina pine with ⅞ x 2½-in. maple flooring in the kitchen and pantry. The finish of the living room, the dining room, the main hall and stairs is of first quality Tennessee chestnut, while the finish of all other rooms is of white wood with birch one-panel doors.

The floor of the bath room is of 1⅛-in. white vitreous hexagon tile with a 6-in. glazed tile sanitary base.

The house is wired for electricity and heat is supplied by a Richardson & Boynton hot water plant with radiators in all rooms.



VIEW OF HOUSE AS SEEN LOOKING TOWARD THE SIDE AND REAR

All exterior woodwork was given two coats of lead and oil paint and the ceilings of the porches were finished with a coat of shellac and two coats of varnish.

All second and third-story interior trim was given four coats of flat white finish and all interior birch doors were finished dull, fumed and stained a very dark mahogany.

The white cement tile of the kitchen and bath room was given one coat of Jap-a-Lac and three coats of white enamel.

All chestnut woodwork was given one coat of stain, one coat of preservative and a coat of wax. The North Carolina pine floors were given two coats of shellac and a coat of wax.

The Dutch colonial dwelling here illustrated and described was built for Albert Hagsted at Great Neck on Long Island, N. Y., in accordance with plans prepared by George J. Hardway, architect, for the McKnight Realty Company, New York City.

Production of Portland Cement in 1915

An estimate of Portland cement produced in the United States in 1915, just made by Ernest F. Burchard of the United States Geological Survey, indicate that the shipments from the mills amounted to 86,524,500 barrels, compared with 86,437,956 barrels in 1914; the production was about 85,732,000 barrels, compared with 88,230,170 barrels in 1914, and the stocks of finished cement at the mills were about 11,583,000, barrels compared with 12,893,863 barrels in 1914. The slight decrease in production and the considerable decrease in stock indicate greater caution in the industry, which in the preceding few years showed a tendency toward overproduction.

The Lehigh district, which produces nearly 30 per cent of the domestic cement, shipped 24,500,000 barrels, produced 24,860,000 barrels and stocked 3,460,000 barrels in 1915, showing increases respectively of 2.2 per cent, 1 per cent and 10.9 per cent over the corresponding totals for 1914.

New York State shipped 5,236,500 barrels, produced 5,097,000 barrels and held in stock 825,000 barrels. These figures represent decreases respectively of 4.3 per cent, 13.4 per cent and 15.1 per cent compared with 1914.

Ohio and western Pennsylvania shipped 7,400,000 barrels, produced 7,200,000 barrels and had 750,000 barrels in stock.

Michigan and northeastern Indiana shipped 5,545,000 barrels, produced 5,550,000 barrels and held stocks of 650,000 barrels.

Southern Indiana and Kentucky shipped 2,780,000 barrels, produced 2,840,000 barrels and had 490,000 barrels in stock.

The Illinois and northwest Indiana district shipped 10,825,000 barrels, produced 10,200,000 barrels and had stocks of 1,511,000 barrels.

The Pacific coast district showed shipments of 5,867,000 barrels, production of 5,712,000 barrels and had stocks of 880,000 barrels.

Cement plants in Kansas, Nebraska, Oklahoma and central Texas showed total shipments of 6,546,000 barrels, production of 6,378,000 barrels and stocks of 786,000 barrels.

In Colorado, Utah, Montana and western Texas the shipments aproximated 2,475,000 barrels, the production 2,525,000 barrels and the stocks 300,000 barrels.

The general prices averaged a few cents lower per barrel in 1915 than in 1914, although toward the end of the year they were considerably higher. The statistics show that the general volume of business was about the same as in 1915, though it was not uniformly distributed throughout the year. During the early part of the year the demand for cement was not great, and in some districts the industry was depressed during the summer by excessive rainfall, but in the last four months or more a decided change for the better has occured both in demand and prices, so that the outlook for 1916 is brighter than for several seasons.

Building the Tower of Babel

BY NOBLE FOSTER HOGGSON

The Tower of Babel was the first building operation undertaken by man. That the enterprise was a failure is common gossip. Not that the builders aimed too high—they hoped to reach Heaven, you remember—but because of a misunderstanding. The plans and specifications seemed clear enough in the beginning, but when it came to interpreting them there was the same diversity of opinion and the same confusion that exists to-day when a building operation is begun in the ordinary method, with a responsibility divided by many antagonistic interests.

When the ark dropped anchor and moored off Mount Ararat the sons of Noah, Shem, Ham and Japhet, journeyed down the Euphrates in search of a good building site. They chose a likely looking plot on the plains of Shinar, upon which to found a city of prodigious extent, and they planned a citadel or tower of uncommon height, a skyscraper that would in fact not only scrape the sky, but pierce into very Paradise itself.

As a building operation the Tower of Babel was a failure; if the true secret were known it would evidently show that the cost of the operation exceeded the amount of the appropriation. At any rate we know that the undertaking was contrary to the design of the Infinite Wisdom, and was defeated by a miraculous confusion of tongues. The Almighty effected a separation of the three tribes by confounding their common language. Then, of course, they could not understand each other, "and they left off to build the city and were scattered abroad on the face of the earth."

It is not exactly clear whether this initial labor friction should be termed the first strike, called by a walking delegate, or whether it was not in fact a "lock out." In either event it was effective, and definitely tied up the erection of the tower. The structure was progressing satisfactorily in every way as long as the interested parties worked together in harmony, and spoke a common language. But the moment the confusion of tongues took place among the builders, nothing further could be done. All was confusion and misunderstanding. It was impossible to go on, so the work was abandoned.

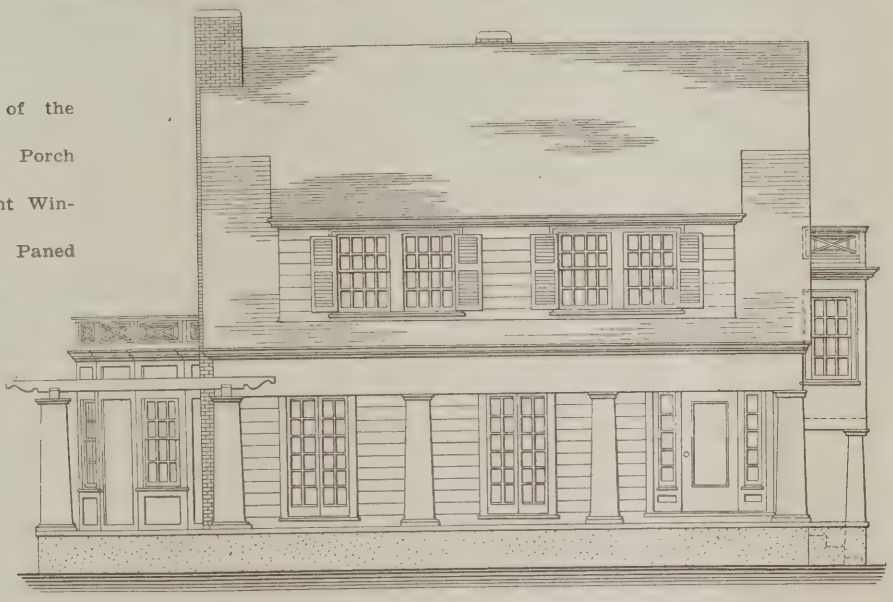
The common mode of building to-day very much

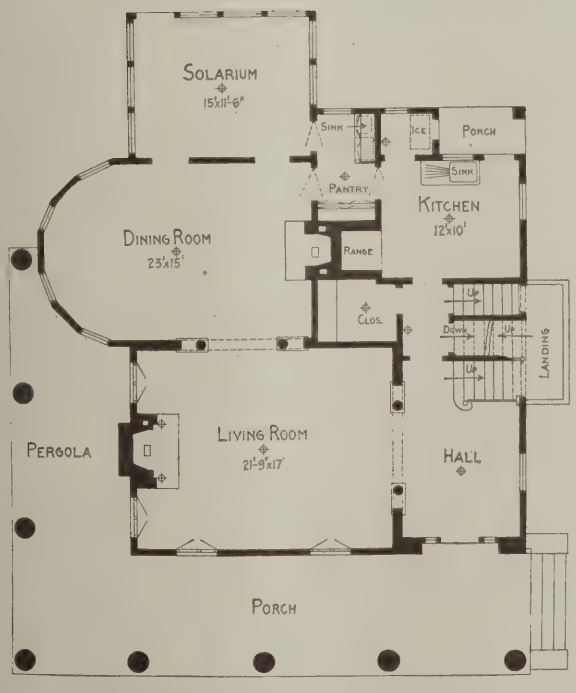


Side (Left) Elevation—Scale 3/32 In. to the Foot

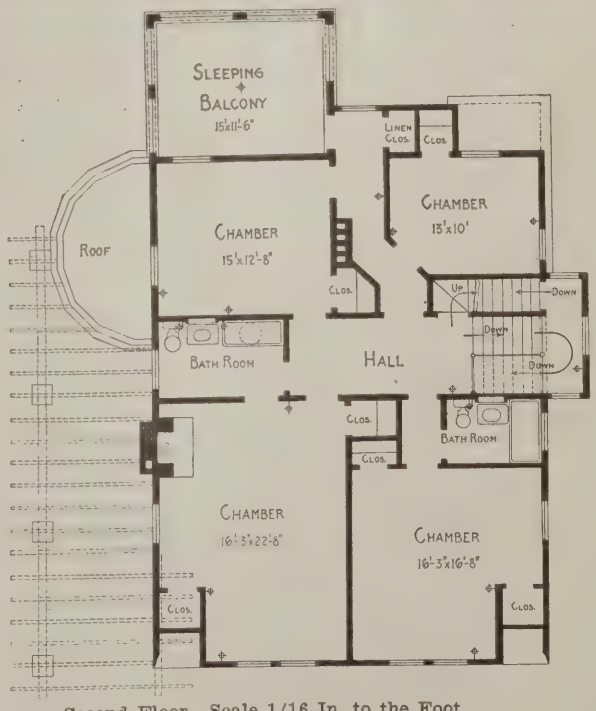
Front Elevation of the House Showing Porch Columns, Casement Windows and Small Paned Dormers

Scale 3/32 In. to the Foot





Main Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

A Dutch Colonial House on Long Island, N. Y.—George J. Hardway, Architect

resembles the Tower-of-Babel manner of procedure. The confusion of ideas, lack of sympathetic understanding and mutual interest, and the division of responsibility work toward disaster. Not perhaps in the sense of initial and utter failure—the impossibility of going ahead with the work at all—but ultimate failure in that such structures reared by workers who do not "speak the same language" are foredoomed to failure.

The bricks used for building in those early days were marked with inscriptions giving the names and titles and achievements of the founders and designers of the various structures. Some of the inscriptions related to chronology, grammar, astronomy and history—"a perfect encyclopedia of the science of that people." To-day the buildings we rear should bear the impress of the character of the future occupant, the character of the designer and the builder, and embody in detail and spirit the knowledge of the different sciences just as surely as though this knowledge were inscribed on each brick and stone which goes into the building.

A modern building should combine strength, beauty, harmony, simplicity, convenience, permanence and revenue. It is only under a form of contract which places upon one concern the responsibility for the design, construction, decoration and equipment of a building that the owner can be assured of a satisfactory and harmonious outcome of his building.

The Unit of Cement Measure

In discussing the question "Why is a barrel the unit of cement measure?" a writer in a late issue of *Concrete* comments as follows:

The Standard Specifications for Portland cement, under General Conditions provide that:

A bag of cement shall contain 94 lb. of cement net, and each barrel of Portland cement four bags.

The 400-lb. barrel originated at the time when all of our Portland cement came from abroad and was actually packed in barrels. When we began to make Portland cement in this country we put it up in barrels weighing 400 lb. gross. Later, when, as a matter of package conservation, we began to put it up in sacks, we ascertained the net weight per barrel and divided it by four.

As will be seen from the specifications, the official unit of quantity is the bag or sack which must contain 94 lb. of cement. This being the standard unit of quantity as well as the unit in which nearly all cement is actually handled, why not make our prices, contracts, invoices, bills of lading, etc., read sacks or bags instead of barrels? In other words, why not price cement in cloth 35 cents per sack gross instead of $1.40 per bbl. gross, and in paper 27½ cents per bag gross, instead of $1.10 per bbl. gross?

In tracing a quantity of cement from the time a quotation is made until the empty sack has been returned it will be seen that the figures are frequently converted from barrels to sacks, and sacks to barrels.

A price is made and accepted. The order calls for barrels but when it is sent to the mill, barrels are converted into sacks and sacks are loaded into the car. In making out the invoice, however, the sacks are converted into barrels but when the consignee receives the car he converts the barrels on the invoice to sacks to check out the contents of the car. When the dealer's customer buys 10 bbls. of cement his order is converted to sacks and 40 sacks are delivered, but in invoicing the material the sacks are converted into barrels and the invoice calls for 10 bbl. The customer then changes this to sacks to make it correspond with the actual delivery.

When the sacks are emptied the word "barrel" seems to get out of our vocabulary and instead of calling "four empty sacks" "one empty barrel," the sacks are called by their right name.

Why should not prices, orders, contracts, invoices, bills of lading, etc., correspond with our goods? This change may seem quite formidable and it would involve a change in the habit of thought of some people, principally the manufacturers of cement, but against the inconvenience of a few hundred people, we will have the convenience of hundreds of thousands of engineers, architects, inspectors, dealers, contractors, bookkeepers, farmers, teamsters, etc.

Fire Retardant Shingles

A method of rendering shingles fire retarding, developed at the Forest Products Laboratory, Madison, Wis., consists essentially in treating the air-dried shingles with a solution of borax in water, says *Hardwood Record.* The shingles are then dried to about 10 per cent moisture and a second treatment with a zinc chloride solution is applied. The shingles are again dried, after which they are then ready for use.

Theoretically, the process depends upon the formation of an insoluble salt by the zinc chloride and the borax, namely, zinc borate. This salt is practically insoluble in water and when heated to a high degree fuses and coats the cell walls, rendering them fire retardant. Shingles treated in this manner and soaked in running water for two weeks still retained their fire retardant properties. When subjected to high temperature the treated shingles will burn, but without a flame, so fire will not spread from one portion of the roof to another in case fire brands fall upon it.

The chemicals required cost about 50 cents per 1000 shingles, but the solution must be applied under pressure and a comparatively expensive equipment of cylinders, pumps and tanks is required. For this reason the method is recommended only where large quantities of shingles are being treated.

The State College of Forestry at Syracuse, N. Y., in carrying on studies of wood utilization in New York finds that of the total cut of lumber in this country 11 per cent, or about eleven billion feet, is wasted yearly in sawdust. It is estimated that in New York State alone an equivalent of nearly 135,000,000 board feet of good lumber goes into sawdust every year. This amount of lumber is enough to build at least two thousand good substantial frame houses.



Some Aspects of Modern Shingling*

A Consideration of the Subject from the Viewpoint of the Workman Rather Than That of the Contractor

By Edward H. Crussell*

IN looking back over the years of a somewhat busy life spent in the wood-working business, one of the things that strikes the writer as being significant is the number of times he has been compelled to change his views, or ideas, concerning fundamental items of that same business.

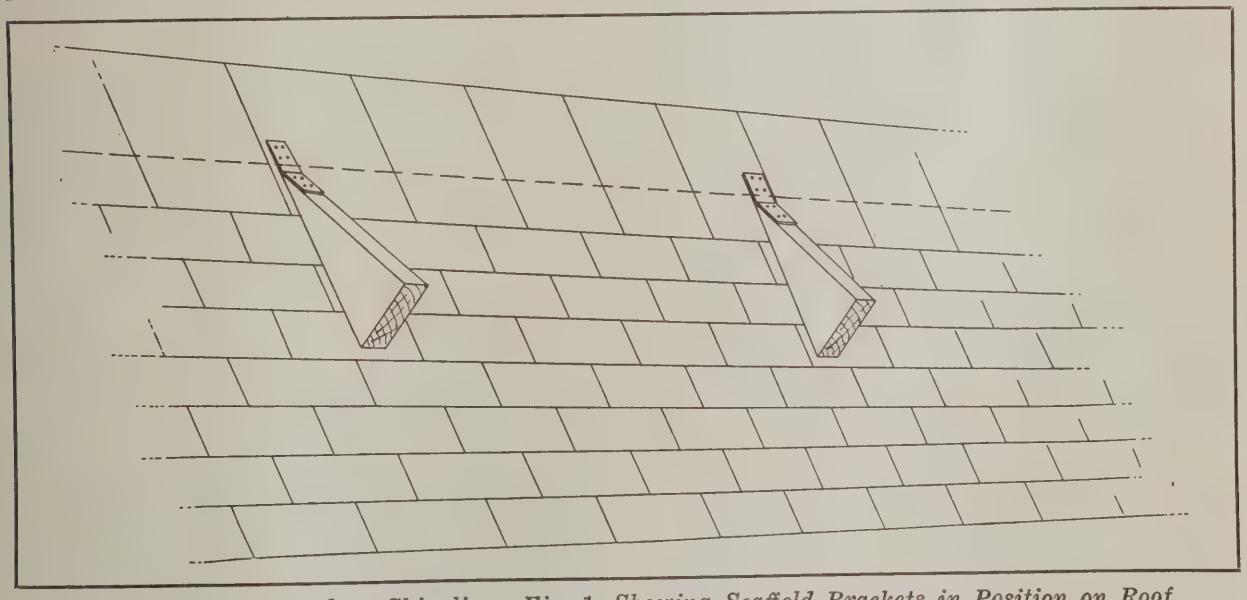
To explain briefly and exactly what is meant by the foregoing let us take an example: In some parts of the country it is the practice, when using corner-boards in connection with siding or clapboards, to put on the corner-boards first and then to carefully cut and fit the siding in between them. In other parts they put on the siding first, letting it run out to the corner, and then nail the corner-boards over it.

To a mechanic who is used to the first method the second method appears to be the work of an amateur, and the writer well remembers his contempt for this method the first time he saw it used.

Since that time, however, his views have changed —so much so that he now thinks the second method is the only correct and logical one, and he realizes that his original preference for the other method was not because it was the better method of construction, but because it required more skill on the part of the workman.

Scores of instances of this kind might be mentioned, and in thinking them over one is led to realize the amount of time and money that may be wasted, and the opportunities that may be lost by clinging to out-of-date ideas for nothing more than sentimental reasons. "The world do move," and it is our duty to move with it. If we do not someone with less sentiment is going to cut across and get into the procession ahead of us.

The following must be the writer's apology—if any is needed—for commencing this series of articles on modern shingling, with a short consideration of wooden shingle substitutes. The mason declares for stone, the shoemaker says "there's nothing like leather," and the carpenter, when he speaks or thinks of shingles has in mind wooden ones only, leaving the consideration of all other kinds to someone else.



Some Aspects of Modern Shingling—Fig. 1, *Showing Scaffold Brackets in Position on Roof*

Wooden shingles make a satisfactory roof covering from every point but one: they are not fireproof unless treated to be fire resisting before being laid. In fact, they are directly the opposite, and on that account their use is not permitted within the fire limits of cities or towns that have building restrictions. If it is considered necessary to guard against the use of wooden shingles in places where there is fire protection, one would naturally come to the conclusion that it must be more necessary, or at

*Copyrighted 1916 by Edward H. Crussell.

any rate, more desirable, to prohibit their use in those places where fire protection is lacking.

Of course, it is generally conceded that if fire once gets a good start on a wooden house it is just as well to let it burn and clear the site, and if fire starts from within a fireproof roof is of little consequence; but in country and suburban districts, where the houses are close enough together for the wind to carry possible sparks from one to another, it surely may be considered advisable for the present-day builder to consider roofing material of a fireproof nature, especially if (as is asserted by the manufacturers and vendors of the roofing in question) the same artistic effects and durability may be secured, and at about the same cost.

Subject Considered from Standpoint of Workman

The substitute, whether of asphalt, asbestos, or metal, *is* fireproof, and what should be of interest to both the workman and the contractor is usually much more easily laid, being of even size, without knots, shakes or cross grain to consider; nothing to do but place them properly and drive in the nails. This series of articles is undertaken from the viewpoint of the workman, rather than that of the owner or contractor, with the idea of offering the said workman a little reliable data on a branch of his trade that has heretofore been somewhat slighted by the technical writers. A discussion of the merits of the various brands of asphalt, asbestos or metal shingles, metal tile, slate or other roof covering, would not definitely decide anything and would, moreover, be sure to lead to needless controversy. About all that the present writer can say is: all brands have certain merits, and all manufacturers put out plenty of literature describing what these merits are. The proper thing for the person interested to do is to write for the literature and from it decide for himself.*

The literature supplied will describe the method of laying, and usually offers some suggestions regarding scaffolding. The writer would mention in passing that the methods of scaffolding to be described further on for wooden shingles are not suitable for putting on asphalt or metal ones. No roof is improved by being walked upon, but the wooden shingle will stand more of this without serious damage than will the substitute.

Scaffolding for Asphalt Shingles

One of the best methods of scaffolding for asbestos or asphalt shingle work is to cut small brackets, to the pitch of the roof, from pieces of 2 x 6-in. stuff, and fasten them to the roof with strips of sheet iron or tin, as shown in Fig. 1. These brackets may be spaced about 10 ft. apart, and should have pieces of 2 x 6 or 2 x 8 laid on top of them to walk on. These pieces are left loose and may be carried up the roof onto other brackets as the work progresses. After the roof is finished the scaffold brackets are removed by severing with a pair of tin snips the metal strips, close up to the lower edge of the row of shingles.

Of course, the metal strips that hold the brackets must be so fastened to the roof that the nails in them are covered by the next course of shingles. This will be understood from an examination of Fig. 1, where the dotted line represents the lower edge of the next course.

Some of the advertisements picture a scaffold formed of a scantling suspended by two ropes from the ridge of the building. This may perhaps be used to advantage when the roofing is in large sheets, but for that in small pieces the writer ventures to assert that the method shown in Fig. 1 is the best. A place to stack the shingles on the roof is necessary, and Fig. 1 supplies it.

These shingles, being laid much faster than wooden ones, it is better to carry them up as they are used, enough help being told off for this purpose to keep the shinglers busy. This method saves unnecessary handling and prevents the bundles being broken open before they are actually needed. Unnecessary handling does not improve the product, and letting the shingles lie around loose is calculated to result only in useless waste.

(To be continued)

*NOTE.—The writer wishes to take this opportunity of thanking those advertisers in THE BUILDING AGE who have so promptly answered his letters of inquiry.

Doors 700 Years Old

There was recently exhibited in New York City four door panels carved in Japan in the twelfth century, and which are said to have once adorned a Shinto shrine. The material of which they were made was Satsuma oak. The eight compartments were ornamented with Howo birds and cloud designs in relief, representing the four heavens.

Advantages of "The Building Age" as an Advertising Medium

We take pleasure in presenting herewith a photo reproduction of a cottage erected at Mosgiel, New Zealand, by McLeod & White of that place. It strikingly illustrates the far-reaching influence of



A Double Wall Concrete Cottage in New Zealand

the advertising columns of THE BUILDING AGE, as the cottage was erected by the use of Van Guilder hollow wall machines which the manufacturers sold by mail through their advertisement in this journal. The photograph was sent to the Van Guilder Hollow Wall Company by the contractors, when ordering a duplicate set of machines, stating that the cottage had been built by that method.

The timber industry represents 37 per cent. of the annual wealth in British Columbia.

Details for Applying Wall Board

Timely Information for the Carpenter—The Framing an Important Factor—Nails to Be Used

By Joseph A. Poesl

EVERY carpenter should make himself familiar with wall board and the way it is put up because it is a material which is for him to handle. Its use in house construction is rapidly increasing, and the man with wall board knowledge is the man who will be the longest employed on the job. Wall board, you know, is often called manufactured or fiber lumber. Both of these terms are entirely correct, for most wall board is merely logs of wood converted into pulp, which is subsequently built up into strong and rigid panels. These panels saw like lumber, and are applied like lumber.

The most important factor in the application of this material is the framing to which it is applied.

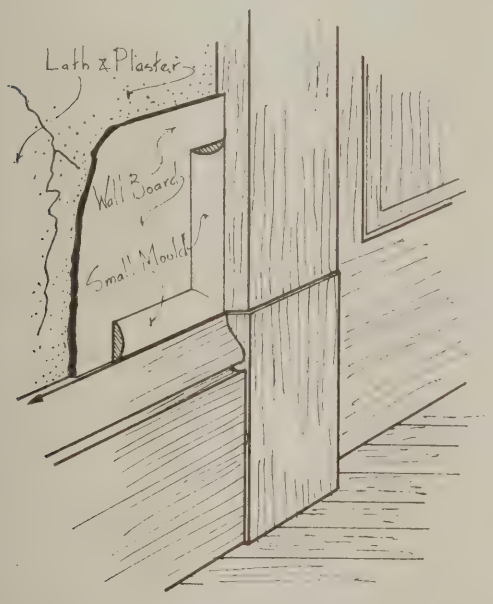


Fig. 1—Showing How Wall Board May Be Used Over Plaster

Rigid and level studding and joists, headers and all additional framing members have much to do with the finished job—much more than if lath and plaster were to be used.

But, before you begin work on the framing, be sure to have a plan before you for arranging the panels in some harmonious and suitable manner. It is exceedingly desirable to have this plan, for the difference between good and bad paneling is the difference between good and bad looking rooms. With it you are permitted to proceed intelligently with the preparation of the studding and joists to receive the board.

Whether the ceiling or walls be covered first is immaterial. Let us, however, begin with the ceiling. Before we commence, bear in mind that two men, working together in applying wall board to a ceiling, can accomplish as much as three men working singly. The use of a prop, or "tee," as it is sometimes called, to hold up one end of a panel while the other is being nailed is desirable only when but one man is available, and as an aid when two men are applying very long panels. In a ceiling panel, the first nail should be in the center, the other intermediate nails should then be driven in, and after these the edge nails. Carefully and very slightly countersink the former so that the decorator may have no difficulty in filling the depressions before painting.

On the walls, one man can easily handle a panel alone unless it is of an extremely large size. Here, the first nail goes in the center of the upper edge, and the intermediate nails follow. Then, beginning at either side of the first nail, drive nails along and around the edges until they meet at the center of the bottom edge. The intermediate nails are also countersunk on the walls.

Generally, the nails on the edges of the panels are spaced at intervals of 3 in., and those in the center from 8 to 12 in. This spacing is followed almost universally, but some carpenters take the liberty of spacing the edge nails as far as 12 in. apart, and get good results. However, do not follow suit unless you have had much experience with wall board and are quite certain that you understand its peculiarities thoroughly.

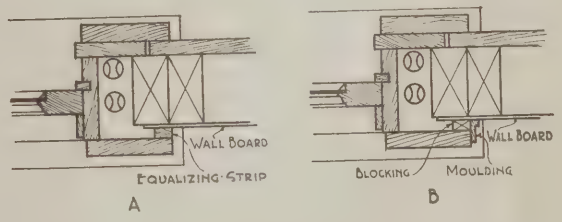


Fig. 2—Use of Door and Window Frames Made for Lath and Plaster, in Connection with Wall Board

The three kinds of nails used in wall board construction are: for the edges common 1⅛ in. flat head; and for intermediate nailing 1-in. finishing, or 1 in. floor nails. Of the latter two, the finishing nail is the more popular, but the other possesses certain advantages which should not be overlooked.

To every 150 sq. ft. of wall board figure on about 1 lb. of the flat-head nails and to every 600 sq. ft. 1 lb. of finishing, or floor nails.

Do not put on door and window casings, trim or other finishing woodwork until after the decoration of the walls has been completed. The right procedure is to decorate the walls, stain the woodwork and apply it. Then countersink the nails,

stop the depressions and put on the shellac and varnish, or whatever treatment is wanted.

A decorative strip or moulding should never be placed where there is no panel joint or where no header is in back of the panel; otherwise the board and the moulding are not likely to fit close together, and consequently will produce an unsightly crevice.

Wall Board for Remodeling Purposes

The use of wall board for remodeling and refixing purposes is tremendous; therefore it is well to know something about the method of applying it over defective plaster. If the plaster is not in such bad condition as to be almost ready to come down, just fasten the wall board directly to it, employing sufficiently long nails to penetrate the lath and hold securely. Around the casings and along the baseboard put a small moulding having a curved, or convex, surface, which will conceal the nails and finish off the joints. Fig. 1 makes this clear.

For covering brick and concrete walls, furr them with 1 by 2 in. strips in the same manner as studding and apply the board in the ordinary way.

Not infrequently, for various reasons, carpenters are confronted with the problem of using door and window frames, made for lath and plaster, in connection with wall board. A number of solutions are common besides returning them to the mill to be cut down. One is to put an equalizing strip under the outer edge of the casing to make up the difference between the thickness of lath and plaster and of wall board. Another is to have blocking take care of the difference and finish off with a suitable molding. These methods are shown in Fig. 2.

Wide Range of Uses

The wide adaptability of wall board to different methods of construction is interesting. In Fig. 3 "A" we have a method adapted to office partitions and to summer cottages for walls and ceilings. The framing is similar to ordinary construction, only the studs and joists should be dressed if a finished looking job is wanted. Method "B" is much like "A," although it is considerably less expensive from both a material and labor viewpoint. The lumber saved by "C" is the principal reason for its being, the labor being only slightly less than in ordinary work. Some, in championing this method, declare that it brings about more attractive panel effects than is ordinarily effected. Of course, it is unnecessary to have every stud rabbeted as shown; only those coming at the edges of the panels need be of this kind. If you were using 32 in. panels every other stud would be rabbeted; if 48's, every third. The others would be regular studs, made small enough to fit the panels and afford a nailing surface for the intermediate nails. In this way the paneling would not be so pronounced as in the other methods.

Considerable importance is attached to "D" because in certain parts of the country it is almost entirely supplanting the common method, due to the peculiar labor and lumber conditions prevailing there. This is true notably in the Far West. Taken all in all, it is cheaper, the claim is made. Instead of using headers the walls are furred horizontally from the top of the baseboard up every 16 in. with 1 by 2 in. strips. At the vertical edges of the panels short pieces are fitted in between the horizontal strips so as to provide an even nailing surface. You will observe that 2 by 3 in. studs are specified in the illustration, which you might think would weaken the construction to a great extent. But the strips brace and strengthen the entire construction so as to overcome the weakening effect of the smaller studs. In the event of your trying this method bear in mind that the window and door frames must be changed in size accordingly.

Wall board construction is new and there is yet a lot to be learned before an absolutely correct method is perfected. So, when you have a wall board job be sure to acquaint yourself thoroughly with the maker's instructions for applying his product; then mix a little judgment with your knowledge of carpentry and you will be certain of satisfactory results.

National Association of Mixer Manufacturers

This association is made up of ten of the leading manufacturers of concrete mixers, and it was the rapid growth of the industry and the lack of standards that were responsible for the formation of the organization. President Capron has stated that the object of the association is to standardize the ratings of concrete mixers, to improve conditions in the field and to establish harmonious co-operation among manufacturers in the marketing of their products.

One of the first progressive moves undertaken by the members was the standardization of concrete mixer ratings, and after thorough investigation and discussion it was decided to adopt the wet batch. This action has been indorsed by the American Concrete Institute, The American Society of Engineering Contractors, The Lehigh Portland Cement Co., The Universal Portland Cement Co., The Chicago Portland Cement Co., and A. N. Talbert of the University of Illinois.

The officers are: President, H. M. Capron, president of the Marsh-Capron Mfg. Co., Chicago, Ill.; treasurer, F. C. Wilcox, Foote Concrete Machinery Co., Chicago, Ill.; secretary, Harold E. Smith, The T. L. Smith Co., Milwaukee, Wis.

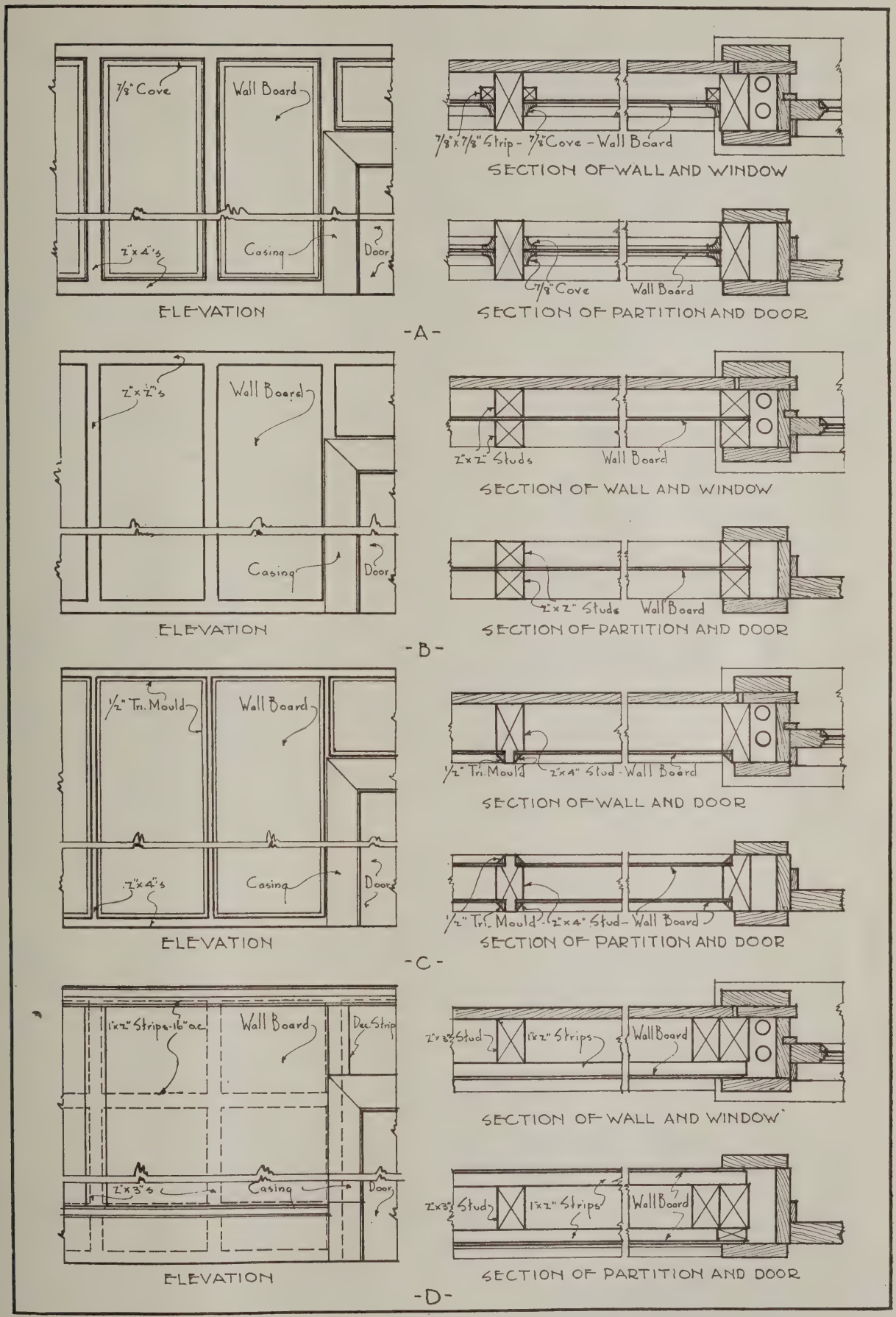
The association holds meetings every month, and one took place during the Cement Show, which was held in Chicago, Feb. 12-19.

The efforts of this organization have received the hearty support of concerns and individuals interested in the welfare of the industry, and the move is evidently a step in the right direction.

By-Products of the Lumber Industry

According to official statistics, the waste in the logging industry of the United States amounts to 15 to 20 per cent of the timber cut, or about a billion and a half cubic feet of wood annually. Saw mill waste also amounts to several billion cubic feet of wood, although not all of it is absolute waste. A Bulletin on the subject of lumber by-products just issued by the Bureau of Foreign and Domestic Commerce, Department of Commerce, makes the claim that only 320 ft. of lumber is used for each 1000 ft. that stood in the forest. The Bulletin in question gives a definite idea of how far the manufacture of lumber by-products has been developed in this

country, how far it may reasonably be expected to develop in the future and just what some of the problems are that confront the industry. The new Bulletin is entitled "By-Products of the Lumber Industry," Special Agents, Series No. 110, and copies are obtainable at 10c. each from the Superintendent of Documents, Government Printing Office, Washington, D. C.



Details for Applying Wall Board—Fig. 3—Four Novel Methods of Wall Board Construction

A Four-Room Cottage for the Suburbs

A Frame Building with Exterior of Stucco Applied to Metal Lath and with Shingled Roof



WE have taken for the subject of our colored supplemental plate this month a design well adapted for execution in the suburban districts and intended to occupy a corner lot. The picture shows the appearance of the finished structure as conceived by the architect, while the drawings upon the pages which immediately follow indicate the interior arrangement of the rooms, as well as some of the more important details of construction.

All foundation walls and footings are to be of concrete, the walls to be 8 in. thick supported on footings 10 in. thick and extending 6 in. on each side of the wall above. The concrete is to be mixed in the proportions of one of cement to three of sand and five of broken stone.

The framing timbers are to be of spruce with corner posts 4 x 6 in.; girders 4 x 8 in.; plate 4 x 6 in., laid flat; floor beams 2 x 10 in., placed 16 in. on centers, and ceiling beams 2 x 6 in. placed 20 in. on centers. Both tiers of beams are to be strengthened with one row of cross bridging. The studs are to be 2 x 4 in. placed 16 in. on centers and doubled at all openings. The rafters are to be 2 x 6 in., the porch floor beams 2 x 8 in., and the porch ceiling beams 2 x 4 in., all placed 20 in. on centers.

Outside Covering of Frame

The entire exterior frame of the building is to be covered with 1 x 9 in. hemlock sheathing laid diagonally and covered with a heavy layer of Neponset building paper, upon which is to be laid 1 x 2 in. furring strips placed 16 in. on centers. To these are to be fastened metal lath, upon which stucco is to be applied. The exterior stucco is to consist of two coats, the scratch coat to be at least ½ in. thick outside of the lath surface and to consist of one part cement, three parts sand and not more than 10 per cent lime putty. The finishing coat is to be ¼ in. thick and to consist of one part cement, two parts sharp sand and three parts pebbles for rough finish. The stucco is to be tinted a cream shade.

The roof is to be covered with red cedar shingles, exposed 5½ in. to the weather, and before being laid should be dipped at least two-thirds their length in Cabot's creosote stain.

The chimney, which takes care of the furnace, the kitchen range and fireplace in the living room, is to have a concrete foundation and be built of brick, the three flues to be lined with vitrified flue lining. Above the roof line the chimney is to be finished with stucco.

The exterior cornice, rails, brackets, trim, etc., are to be of clear white pine.

The floors of the principal rooms are to be double, the sub-flooring to consist of 1 x 9 in. tongued and grooved hemlock, and the finish floor to be ⅞ x 2½-in. maple. All other rooms are to be floored with ⅞ x 2½ in. Carolina pine.

The Trim

The trim for the living room is to be cypress, and that of all other rooms white wood. The feature of the living room is the large open fireplace at the center of the interior wall and between the door leading to the hall and the one giving access to the kitchen by way of the pantry. The rear portion of the living room is to be used as a dining room. The walls are paneled with plain strips of wood between which are rough plaster. All doors are to be of cypress. The ceiling is beamed.

The color scheme suggested for this room is a flat old English brown stain for the woodwork and old rose for the side walls, and for the ceiling between the beams a light cream.

All trim in the bed rooms is to be enameled and the doors stained an old English brown. The bath room trim is to be enameled white. The walls and ceilings of the bed rooms are to be treated with waterproof paint, flat finished.

The hall and living room trim is to be treated with a good wood filler, stained and varnished and finished flat. The floors are to be varnished with the exception of that in the living room, which is to receive an additional coat of wax.

The kitchen, being centrally located, is within easy reach of all parts of the house, an arrangement which will save a great many steps for the housewife. The side walls for a height of 4 ft. 6 in. are covered with waterproof cloth in tile effect. The walls above are painted with waterproof paint, light blue and and the ceiling white. The pantry and the bath room are similarly finished.

The Plastering

The walls and ceilings of the rooms are to be plastered with a hard smooth finish, except in the living room which is to have a sand finish.

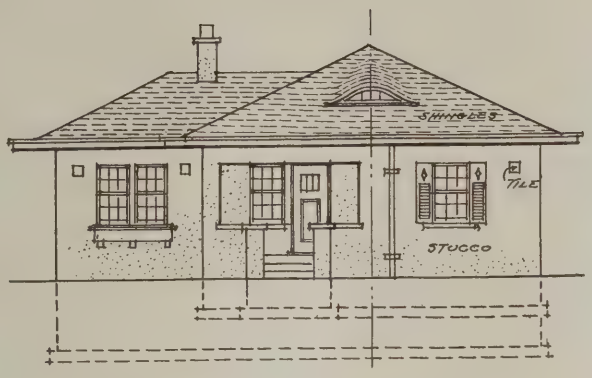
All sheet metal work is to be painted on both sides before being laid and all leaders are to be of galvanized iron of a neat square design.

The exterior trim of the house is to be painted three coats of white lead and linseed oil, well puttying the first coat.

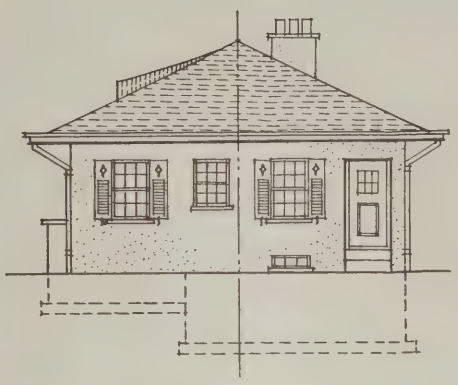
The hardware is to be of a bronze plate finish and to match the lighting fixtures. The lighting is to be by electricity and the living room is to contain two drop pendants of two lights each.



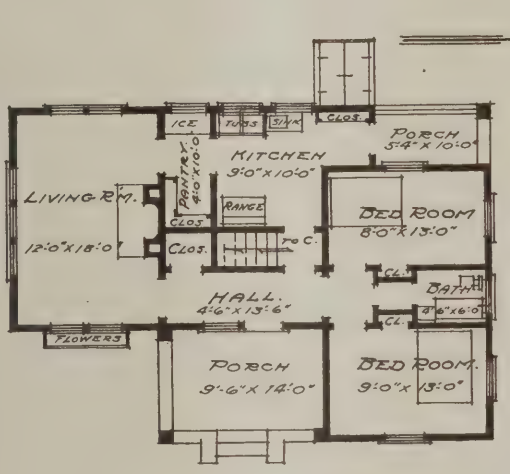
BUILDING AGE
NEW YORK



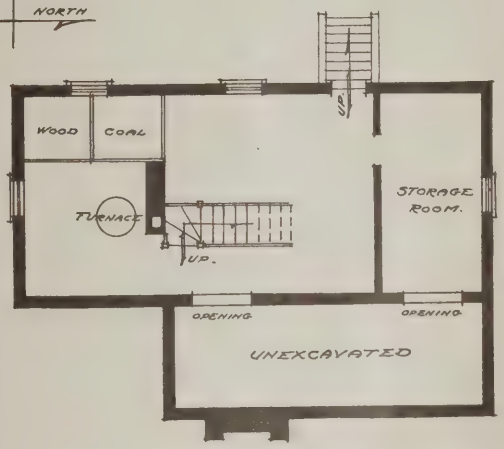
EAST ELEVATION



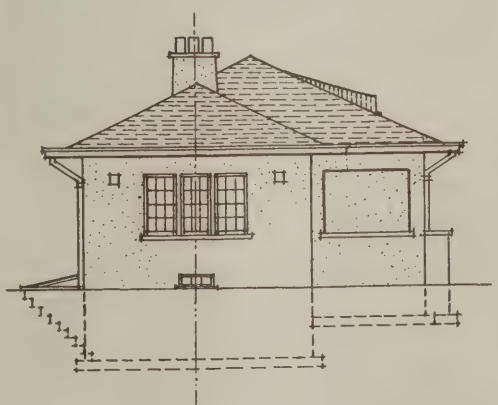
NORTH ELEVATION



FIRST FLOOR PLAN



CELLAR FLOOR PLAN.



SOUTH ELEVATION.



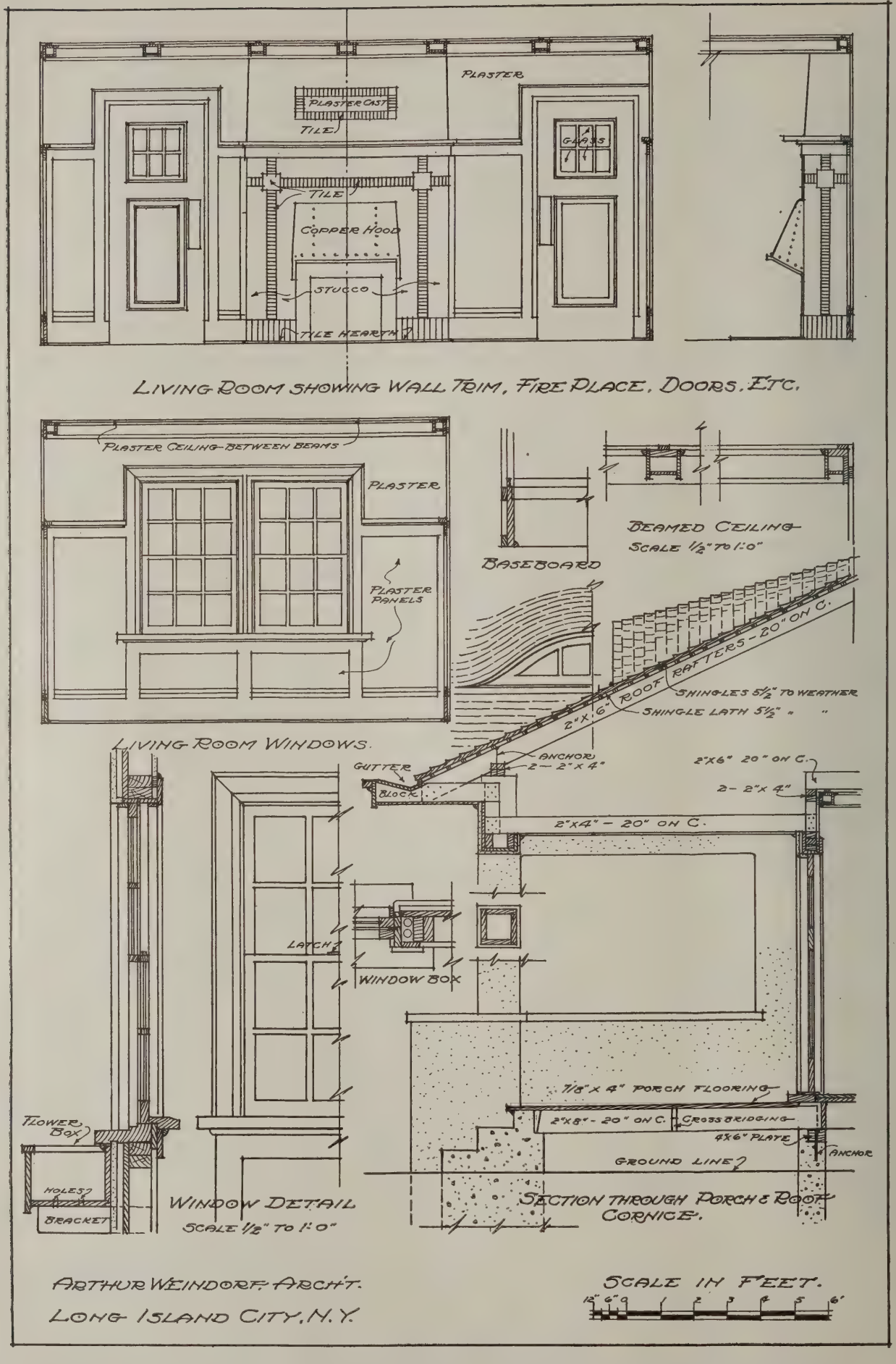
WEST ELEVATION

CELLAR 7'-0" HEADROOM.
FIRST FLOOR 9'-0" " "

ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N. Y.

SCALE IN FEET
0 4 8 12 16 20 24 28 32

Plans and Elevations of Four-Room Cottage Shown on Our Supplemental Plate



Miscellaneous Constructive Details of Four-Room Cottage Shown on Our Supplemental Plate

A good system of plumbing is to be installed with simple fixtures, using a galvanized iron enamel sink, a two-part wash tray of soapstone and a 40-gal. galvanized iron boiler over the range. The plumbing is to be of the exposed pipe type, and all rough pipes are to be painted with enamel paint. The plumbing in the bath room is also to be of the open type and the fixtures are to consist of iron enamel bath tub, a water closet with china bowl and low tank, a wash stand with a marble top, and china wash basin. All exposed pipes are to have a nickel plated finish.

The house is to be heated by hot air furnace of such capacity as to maintain a comfortable temperature within when the thermometer registers zero outside.

There is to be a cellar under the main portion of the house to contain a large furnace and storage room.

The architect estimates the cubic content of the house to be 20,692 cu. ft. and places the estimate of cost at 14c. per cubic foot.

The cottage here shown was designed by Arthur Weindorf, architect, Long Island City, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Details of a Home-Made Glue Press

A Device Which the Country Carpenter, the Cabinet Maker and Even the Builder Is Likely to Find Useful

BY W. S. WILKIN

A PIECE of equipment which should be of interest to a great many builders, if not to the average carpenter, is the home-made glue press illustrated herewith. I have done a great deal of gluing in a press something similar to the one here shown, and am therefore familiar with its possibilities. Of course, it is not as good as the improved glue press of the present day, but there are not many of us who have sufficient work of that kind to do to make it profitable to purchase a new press. Many of us perhaps do not have any work at all of this kind to do, but still there are times when the man without one would give several dollars if he had one in his shop so that he could use it a few hours on some job.

There is lots of work for which some heavy boards and hand screws will answer the purpose when no press is available and when it will not pay to make one. The press, however, which is here shown can be built without going to much expense. The material may be some good hard wood such as oak or maple, and to make a good bottom it should be glued up as shown. It is necessary to get out all the wind and dress the stuff smoothly so that the result will be something that will hold its shape. The bottom may be covered with zinc, as this will not rust and glue will not stick to it.

The size of the iron or steel blocks through which the screw operates will regulate the size of the timbers "B." The timbers must be set far enough apart to allow the block to slide back and forth loosely. It will be seen that the iron blocks have lugs on the top and bottom which hold them in place. There will be little wear on the top of "B," as the weight of the screws is all that it will be required to support, but when the screws are tightened they would soon cut out the bottom side unless there be a piece of scrap iron screwed on as shown at "i."

Referring to the sketches, Fig. 1 is a plan, Fig. 2 the front elevation and Fig. 3 the end elevation. The timbers "E" and "F" are cut out so that the rods may be removed when putting things into the press and then they can be slipped in and the screws

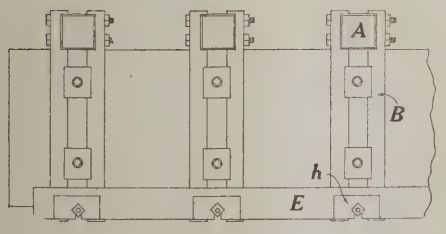


Fig. 1—Plan of the Press

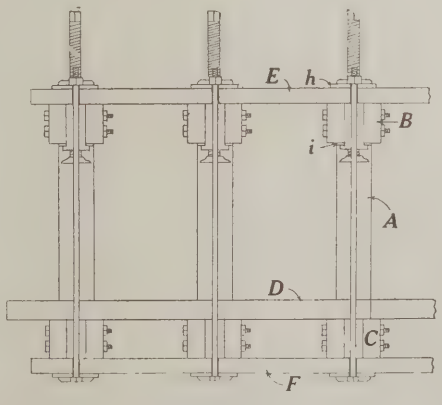


Fig. 2—Front Elevation of the Press

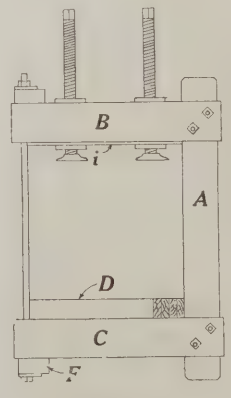


Fig. 3—End Elevation

Details of a Home-Made Glue Press—Some of the More Important Features of Construction

tightened up. The iron plates at "h" are cut out the same as the timbers and put on both top and bottom to keep the nut and head of the rod from cutting into the wood. The bottom "D" may be put in loose or screwed down to the piece "C." The posts "A" are gained to receive the piece "B," which is bolted up tight as shown.

It will be noticed that the rods do not help to hold up the top of the press. The post "A" must do this. Sometimes the timbers "B" and "C" are run on back and a row of screws put in on that side of the posts. This balances the press better, but it makes it larger and costs more. The carpenter might run one row of screws each side of the post and it would be just as good for narrow work. Sometimes, however, it is necessary to glue up wide material. A post could be used in front at each end and rods the rest of the way. This would probably support the top better and still be opened up in front sufficient for all purposes.

Support for the Press

The press may be leveled up on some blocks or beams, or if it is likely to be moved it can be put on heavy casters. The pieces "E" and "F" may be bolted to the cross pieces or they may be put on with lag screws, as there is no strain to pull them off, the pressure all being the other way.

The screws should not be set too far apart—not over 18 or 20 in. at the most. If the screws are too far apart they will not hold the work down tight between them. In veneering, or work like that, it is very essential that it be held down snug so as to give a satisfactory job.

In veneering or gluing up any work that is to be finished for varnish, care must be taken that the bottom of the press or the boards to be used on top have no hard pieces of glue on them, as they will press holes in the wood that will be hard to get out.

A press like this can be built any size to suit the owner. It could be long with a single row of screws or it could be built 3 or 4 ft. wide with a row of posts on each side and 3 or 4 rows of screws.

Using Jack Screws

Most any man doing jobbing work or building will have use for jack screws, and if so, he could make good use of them in a press like that here described, and at the same time the jack screws could be made to serve the double purpose of both inside and outside work, which will tend to reduce the cost of the press somewhat.

The material may be put in the press, the boards placed on top, and blocks put on top as usual, then set a jack in position, and place a good block on top of it, screwing it up against the pieces "B." If one is going to use jacks the press should be made lighter than otherwise, for the full length of the jack must set under the pieces "B."

I do not think it pays the small builder to be without a good shop, for in the winter as well as in slack times he can obtain many little odd jobs that will bring in a few dollars and will always keep him in touch with the people of the community.

I think it would be very interesting to hear from some of the other readers of THE BUILDING AGE along this line, more especially such as jobbing and building through the country.

I would say in conclusion that the sketches are drawn to scale so that the reader may have some idea of the proportion of the timbers. The bolts through the posts should be about $\frac{5}{8}$ in. and the rods in the front about $\frac{3}{4}$ in.

Building Operations in 1915 on Long Island

Each year a compilation of the new buildings erected on suburban Long Island is made by the railroad of that name, and according to the figures for 1915, now available, there were 8895 new structures put up, of which 7276 were dwellings, this being very nearly the high-water mark.

According to A. L. Langdon, traffic manager of the road in question, the buildings heretofore erected are occupied. The known preparations indicate more building during the coming year than ever before.

It is expected that in one year more the New York Connecting Railroad will be completed, which will give direct rail connection betwen Long Island and New England, and will add much to the advantages of Brooklyn and Queens for manufacturing and commercial purposes.

A tabulation by the railroad shows that in the last ten years 71,660 new buildings, including 62,916 dwellings, have been erected on suburban Long Island; that is, the portions lying outside of Brooklyn and Long Island City.

Concrete Grain Tanks of Unusual Construction

At the present day concrete is being used for every conceivable form of building construction, and interesting developments are constantly being brought to light, one of the latest being exemplified in two concrete grain tanks recently erected at Shreveport, La. The foundation walls are of brick and these support concrete walls which are only $2\frac{1}{2}$ in. thick. The walls are built up of curved sheets of what is known as Hy-Rib, to which the concrete is applied in the form of a plaster coat. The reinforcement consists of vertical rods placed at intervals of about 3 in. around the circumference, these rods keeping the curved sheets in perfect alignment, and where the grain pressure is heavy additional reinforcement is added to take care of the strains.

The tanks are 20 ft. in diameter and the bottom of each tank is in the form of an inverted cone, so as to permit the use of conveying machinery in emptying them. The bottom is of concrete construction about 6 in. thick. The architect for the concrete tanks was J. Y. Snyder, of Shreveport, La., and the Hy-Rib reinforcement was furnished by the Trussed Concrete Steel Company, Youngstown, Ohio.

R. P. Miller Chosen Building Expert

Rudolph P. Miller, formerly Superintendent of Buildings of the Borough of Manhattan, New York, has been retained by the Board of Aldermen as expert on buildings to assist the committee on ordinances to complete the Building Code for the city. The term of service will be six months.

It will be recalled that Mr. Miller supervised the revision of the entire Building Code, giving up his position as Superintendent of Buildings in Manhattan to undertake the work.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

A Combination Silo and Windmill Tower

From W. E. Frudden.—It may prove interesting to some of the readers to have a few particulars relating to the picture accompanying this letter, so I give them herewith. The picture shows a silo being filled with ensilage. It is a 12 x 50 ft. clay tile silo, but the cost has been reduced 50 per cent by eliminating the windmill tower which would have otherwise been necessary. It is located on a dairy farm near Campbell, Iowa, and the walls are made of special 4-in. "Adel" silo tile. The windmill is an 8-ft. Carter wheel and drives through a walking beam and triangles to



A Combination Silo and Windmill Tower

two pumps in nearly opposite directions, both of which are 150 ft. distant from the base of the silo.

The windmill tower is fastened into the concrete to special cast-iron plates, which are also utilized where any concrete foundations are used, and a reinforcing rod goes over and under these plates in the concrete. The latter is about 16 in. thick at the center of the roof of the silo and 8 in. thick at the sides or cornice, the weight being sufficient to absorb all vibration and preclude the possibility of any storm affecting the rigidity of the walls. The latter are built in the usual manner for silos of this type, with the customary No. 3 wire in the joints.

The door frame is of the ingot iron type with a steel ladder and removable rounds in the doorway. The chute at the time the picture was taken had not been added, but has now been extended so that a door opens out of the top of the chute, which is 4 ft. higher than the roof, the door swinging outward, so that a man simply goes out of the chute onto the roof. In this way it is a great deal safer to take care of the oiling, etc., of the mill than one on top of the ordinary windmill tower.

The top of the wheel is 65 ft. It has proven successful in many respects. Few have been built this way, but it is probable that from now forward a large number of farm owners will follow suit. Silos are being built in large numbers throughout the Middle West, and many of them will follow the plan here outlined. At this time silage is being fed out of the silo, and reports are that it is an unusual fine quality feed for live stock. Silos are usually considered as being as important on the dairy farm as a deep well, and to the beef cattle industry it has come now as a first aid. Silos are towers of prosperity.

Repairing a Concrete Roof

From J. B., Wyoming, Iowa.—I would like the advice of some of the practical readers of the paper regarding a concrete roof that I put on a garage late last fall and it now leaks. At the time the work was done some of the concrete froze and the roof is now cracked in places. How can I repair it properly when warm weather comes around? Shall I have to use some other material than waterproof concrete in order to repair the damage?

Durability of Metal Lath for Exterior Work

From F. D., San Diego, Cal.—For the information of "G. R. M.," Rapidan, Minn., concerning the life of metal lath for exterior work and whose communication appeared on page 56 of the February issue of the paper, I would say that my experience in that line has demonstrated the fact that metal lath will not corrode if properly covered with cement or lime mortar even if it is not galvanized or painted. The various brands of "hard wall" or plasters made from Gypsum in which the setting is retarded by chemicals are on that account injurious to metal lath which is not painted or galvanized, and especially so if the wall is exposed to dampness.

I have seen metal lath even when it was used in interiors in such cases in three years' time so rotten that it would crumble under the touch. Lime or cement on the contrary will preserve the metal and will absolutely prevent rusting wherever it is in close contact with the lath.

Fitting and Hanging Doors

From "D. P. B.," Redford, N. Y.—Having read the articles recently published on door hanging, I have thought a few of my "wrinkles" might be helpful to those on the lower end of the ladder. I follow the practice of "G. L. McM.," Tacoma, Wash., to a considerable extent. The trestles, straight edge, two slender sticks shorter than the opening, and jack



Fitting and Hanging Doors—Side View of the "Jack"

constitute the paraphernalia. The jack is made of any convenient piece of lumber, 4 in. or 5 in. wide. A notch is made in the center and all the cuts are beveled the same way. The notch is wide enough for the thickest door, and a little wedge holds the thinner ones. I put this between the jambs about 30 in. from the floor beyond the rabbets.

If there is much to take off I use the rip saw on both edges; if not more than ⅛ in. I use the straight edge on the lock jamb. If no threshold is used I cut off the top lugs on the trestles. If there is no rabbet I set in four small nails to supply one. I use a try square and bevel as I joint—⅛ in. bevel for a door 2¼ in. thick is sufficient, as that is the standard bevel on the face of locks. If the door is rather narrow a little more bevel is safe.

I fit the lock stile first in order to have more timber for the lock, and as that stile is more noticeable. When the lock stile is jointed I take the sticks and measure the opening top, bottom and center and connect these points with the straight edge. The door is dressed to the line, then set in tight; the top scribed with rule or compass and the bottom picked, the spots where the door binds being checked with the pencil. The door is then taken down, dressed if necessary, and the top fitted. This may be done on the trestles if the opening is square. The door is then set in, wedged up tight, any unsatisfactory spots noted and the butts marked, three to a door 2 ft. 6 in. x 6 ft. 6 in. and above. A butt gage is used. All the marks are deeply cut with the knife before a chisel is used. The chisel should have at least a 6-in. blade to keep one's hands out of the light, and should be of the paring tanged firmer unbeveled type. The thinner the chisel the less enlarged will be the butt mortise.

Two bit braces are necessary, Forstner bits being used to bore out the butt mortise. A little practice will enable one to regulate the depth by the eye. These bits are a joy in such grains as cypress and Oregon spruce.

Outside door thresholds here are made on the sill. In this case the bottom must be fitted before the top. I do not leave any opening round the door, just enough to freely open. When the door sets there is opening enough. I bore in with a small bit for the screws—the center screws first—put the butts on and hang the door. If everything passes inspection the door is swung a few times and the other screws put in with the door swinging. This insures loose pins and first holes for the screws.

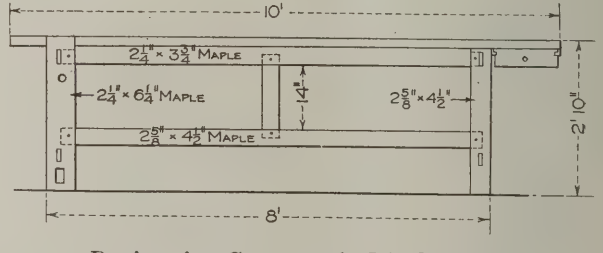
The lock is placed across the edge of the door, the face marked top and bottom on the corner with the knife, then across the top and bottom of the lock with a pencil. This is the boring limit. The lock is then put on both sides of the door and the knob and keyholes picked. The strike is mortised with the Forstner bit.

For the butts I gage the jamb first, measure accurately from the gage line to the shoulder of the rabbet and put this on the outside of the door with a thumb gage.

Design for Carpenter's Workbench

From Contractor, Moffittsville, N. Y.—In the November issue of the paper, "W. M. L.," Orange, N. J., asked for the design of a house carpenter's workbench and tool holder combined, the cabinet for the tools to contain portable compartments. In reply I would state that there are some of these on the market, but mostly for students. I am sending a drawing of one of my benches which the correspondent can no doubt finish to suit his needs. By rabbeting the inside of the rails he might set in a floor, put in divisions for his tills, say 6 in. high, then cover this over with matched lumber. This will give a place for tools above. The rails may be lowered some, if necessary.

This bench is of hard wood. The tenons are ¾ in. x 2¼ in. The top should be grooved half way through on the underside with a fine circle saw. It is bolted down and the tops of the bolts are plugged loosely so that the top can be taken off easily. The rear leg and center post are bored for pins to hold lumber. It is all pinned, and whatever the correspondent adds should be put on in the same way



Design for Carpenter's Work Bench

with the idea of taking it apart when storing or moving. If the correspondent will refer to page 331 of the issue of THE BUILDING AGE for July, 1913, he may obtain some ideas on tills and saw racks.

Obtaining Bevels for a Diamond Spout

From R. C. H., New Salem, N. D.—As I am about to do some millwrighting in the near future, and this being a trade in itself, I would like to ask the practical readers how to obtain the proper bevel for gaging and joining a diamond spout regardless of the angle it is run. I have no trouble at all finding top and bottom cuts, as I obtain these with a string and very thin board, marking the

pitch on the board and then setting the bevel square to mark on board. This, however, does not give the bevel for joining the boards for the spout.

This work is somewhat outside the field of carpentry, but very often a person is called upon to do odd jobs such as this, and all one can do is the best he knows how. I would, however, like to know the proper way.

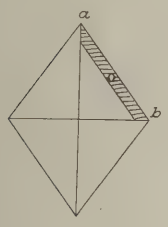


Fig. 1—Obtaining the Bevels

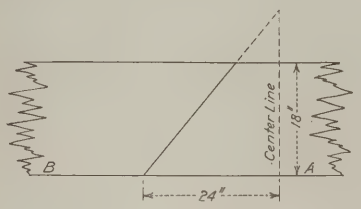


Fig. 2—Showing How to Cut the Hopper

Obtaining Bevels for a Diamond Spout

Note.—We have received some interesting comments on the above topic from Mr. Barry, and submit them herewith for the benefit of the correspondent above.

The manner in which the bevels for a diamond spout are obtained is shown in Fig. 1 of the sketch. The spout is laid off on the major and minor axes of an ellipse and the bevels at *a* and *b* will be the same for all four pieces. Increasing the major axis and decreasing the minor axis will vary the form of the spout.

Fig. 2 shows how to cut a hopper. The center line 18 in. in this case is the vertical height of the hopper, including the discharge. The hopper is taken as 48 in. square at the top. Take 18 on the tongue of the square and 24 on the blade and apply to the line *a b* and mark by the blade for the side.

I will give a few cuts for different hoppers, the figures being those to use on the square for right-angled hoppers with miter-joint.

Slope of Hopper	Face Cut	Edge cut
4 in. in 12	11⅜x12	3¾x12
6 in. in 12	10¾x12	5⅝x12
8 in. in 12	10 x12	6⅝x12
10 in. in 12	9¼x12	7¾x12
12 in. in 12	8½x12	8½x12

Cut by the varying figures.

The following are the figures to use on the square for right-angled hopper with butt-joint.

8 in. in 12	10 x12	14¾x12
10 in. in 12	9¼x12	11⅛x12
12 in. in 12	Same as for mitre joint	
15 in. in 12	7½x12	6⅛x12

Hanging Glass Doors

From Contractor, Moffittsville, N. Y.—According to my notion there will never be any uniformity as regards the practice of hanging glass doors. If the door is so placed that neither rain nor frost will strike it the glass may be hung according to the taste of the builder or owner. If rain will strike it, place that side out which is least impervious to rain. Whichever side is placed out may be greatly protected by careful puttying and painting at glass and moldings.

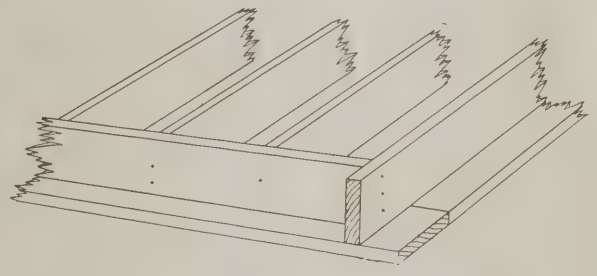
If "C. W. R.," Terre Haute, Ind., has some of the earlier files of THE BUILDING AGE he will find numerous illustrations of tool chests which may serve his purpose. I refer especially to page 80, February, 1913; page 239, May, 1913; page 284, June, 1913; page 331, July, 1913, and page 377, August, 1913.

Methods of Building Construction

From J. P. W., Lane, Kan.—I notice on page 23 of the January issue of THE BUILDING AGE the method of house building suggested by G. L. McMurphy, and as he invites suggestions from other builders, I am taking the liberty of offering a few comments. At the outset I desire to say that I began my apprenticeship under a New York builder in the fall of 1879 and learned to frame a sill just like that shown in Fig. 1 of Mr. McMurphy's drawings. With regard to a built-up sill, I changed my ideas twenty-five years ago, and in the accompanying sketch show the way I frame a box sill. I use the same size timbers for sill that I do for floor joists, and the edge sill is placed the width of the studs from the outer edge of the flat sill. The studs run clear down to the flat sill.

The floor lays over the edge sill, flush with the studs and is rat-proof. The building cannot blow away without taking the sills, joists and floor with it, as could happen with the sill of Mr. McMurphy. This method also saves the 2 x 4 which he spikes down on the sub-floor and on which he sets his studs.

Now his corner posts would be O. K. if the studs were just twice as wide as they are thick, but such is not the case here. All dimension lumber here is ⅜ in. scant in width and thickness, so his corner would be 3⅝ x 3¼ in. if made of 2 x 4-in. material.



Methods of Building Construction—Making a Box Sill as Suggested by "J. P. W."

I cannot say that I like Mr. M.'s method of second-story construction. In fact, I call it bad construction for a country where the wind blows as it does in Kansas. I should prefer the studs full length, and I even prefer the sheathing on the inside of the wall instead of outside. This should be put on horizontally and lathed diagonally flat on the sheathing with no furring between.

Roofing with the Steel Square

From D. P. Barry, Redford, N. Y.—Referring to the comments in the February issue of "G. L. McM." I would say that I did not intend to convey the idea that the rule would work only after the rafter was backed. It will apply before the rafter is

backed and even if it is not backed at all. The lines *A A* of Figs. 1 and 5 in the October issue are just where they ought to be. A vertical plane coinciding with the outside wall of a building would be parallel to those lines and pass through them after those rafters were placed in position on any building. If the hip be backed those two lines must be equal to each other. If not backed they may be equal or not according to who is doing the work. The vertical line *A* in Fig. 5 is measured

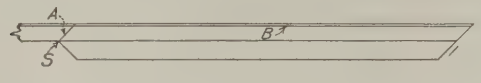


Fig. 1

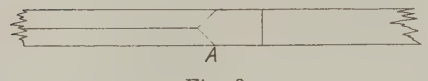


Fig. 2

Roofing with the Steel Square

where a line representing the plate, upper outside edge, intersects the projection of the hip rafter on the plate. I will reproduce Fig. 5 to apply the rule, as shown in Fig. 1 of these sketches.

Assuming that *A* on the common rafter is 3 in., *A* on the hip is the first line to be drawn. For all ordinary roofs with 2 in. hip rafter *A* extends from *S* to the top corner of the rafter, or is 3¼ in. long. The line *B* is gaged 3 in. from *S*. Dress from the center of the rafter to *B* and go your way rejoicing among mechanics for that is all there is to it. For a very steep roof make the line *A* ⅜ in. long and *B* would be ⅜ in. from the top edge of the rafter, or 3 in. from *S*.

The discussion in regard to the position of *A* seems to me like a tempest in a teapot. The line *A* is taken on each side of the hip just as it is taken on each side of the common rafter. When the hip is backed and grooved on the underside the line *A* will be equal to any other line taken diagonally across the hip over the outside edge of the plate. If the hip is mitered at the deck or ridge its length can be taken on the side as well as on the center.

Fig. 2 shows the underside of the hip when grooved. I am inclined to think the correspondent was forced to the expedient of beveling the plancier at the hip by my strictures, but bumped into the valley without seeing that the roof boards must be beveled in the same way in order that the facia may not be too narrow. There are thousands of buildings erected every day to which my strictures do not apply. I have seen some jobs where the builder discovered that the center of the valley was too high and without being able to find the cause resorted to the expedient of raising the bottom end of the valley cripples above the edge of the valley rafter. This, however, only distributes but does not remove the evil.

Rafter finish consists of more than cornice. The entire rafter system is planed and chamfered, the roof boards planed and beaded and unless the valley is grooved there will be an ugly opening the entire length of the valley and for a one-half pitch roof it is more than ¼ in. wide. It is an aggravating job to get a valley level in the center with the common rafters unless it is grooved and then when grooved the measurements are taken just the same as for the hip.

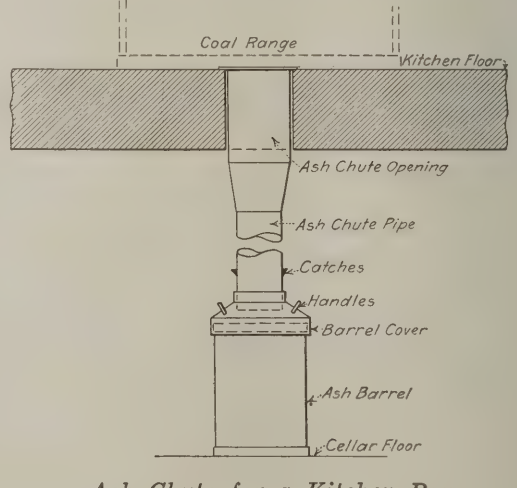
It was not my intention to say I had never seen a work line used on hewed timber. The correspondent stated the work line was used on hewn rafters and such a line on them, to my mind, would be entirely useless. I said it was used to avoid working off superfluous timber. When a 10 in. timber is sized to 9 or 9½ in. the size line is the work line. It can be used only on the housing face of posts as for braces, girders, girts, etc. Every piece of timber in a frame, except the corner and center posts, is worked from the hew line. In center posts the work line is placed on the center of the outside face.

I confess that I know nothing about timber sizing in Washington, but I do know the clapboards we get from there vary ⅛ in. in thickness on the thin edge. Superfluous timber does not interfere very much with a man who knows how to frame. I measured some girders in a mill I took down a couple of years ago and found they were 17 x 22 in. in cross section by 40 ft. in length, were double braced and triple pinned; structural steel could not fit neater.

In conclusion I will say that if the hip is grooved on the underside for plancier and the valley is grooved for the roof, the boards will not slip out of place while nailing. The groove is a guide and all the work is reduced to its simplest terms.

Ash Chute for a Kitchen Range

From J. B. M. C., Brooklyn, N. Y.—In answer to "K. V." of Paterson, N. J., asking for information concerning a practical ash chute for a kitchen range, I desire to suggest the idea indicated in the accompanying sketch which has proven thoroughly practical. A cast-iron plate is placed in the bottom of the ash pit of the range which has an opening toward the front of the stove varying from 9 x 9 in. to 12 x 12 in., according to the size of the range. This opening has a cast-iron sliding cover. A hole



Ash Chute for a Kitchen Range

is cut through the floor the same size as the opening in the ashpit and directly under it. A black sheet iron sleeve is then put down in the hole and long enough to extend a little below the ceiling line of the floor above. This is secured at the top by a flange resting at the floor.

To the bottom of the sleeve is attached a round pipe of sheet iron extending down to a point a

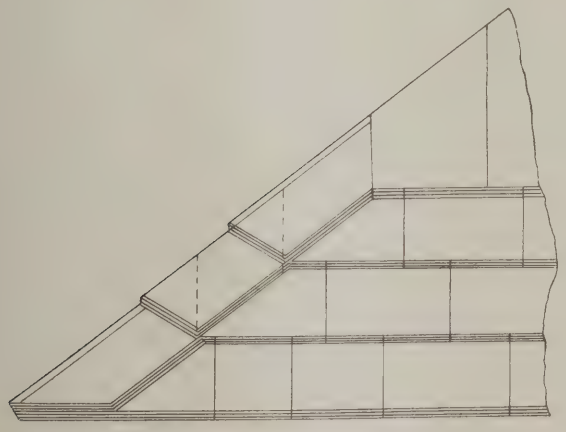
little above the top of the ash can or barrel. At the end of this a cover is connected, which slips up and down on the outside of the pipe and also fits over the top of the can rather snugly.

When ashes are being dropped down the chute the cover is slipped over the can so as to keep the dust within, and when the ashes are to be removed the cover is slipped up and rests on catches, thus allowing the can to be moved free and clear. The pipe is usually braced from the rear wall and sometimes the pipe and can are enclosed by walls with a door in front so as to absolutely confine all dirt and dust.

"Boston" Hip Construction

From G. A., Fairbury, Ill.—Will the editor kindly advise me how to lay what is termed a "Boston hip" on slate roofs. I am called upon to do a job of slating in which the above is specified and am at a loss to know how to proceed.

Answer.—In the accompanying sketch we present a view of a portion of a hip roof showing the general arrangement of the shingles or slate as the case may be. The lower course is laid in the



"Boston" Hip Construction

usual way and then the hip shingle is put on with the upper portion cut away at the angle indicated by the dotted line. This allows the second course of shingles to form a close joint with the hip shingle. The operation is repeated for the different courses, care being taken to alternate the laps on the hip as indicated in the sketch.

Suggestions Wanted for a Store Building

From A. S. Chapin, Northern, Minn.—I am contemplating the construction next spring of a store building, and although I have been a reader of the paper since it was first published this is the first time I have come to the Correspondence Department for special information. I want to build a mixed or general store with pool room for two tables and to carry in stock flour, feed, shoes, hardware, clothing, dry goods, farming implements, furniture, etc., etc. I want a concrete basement under the front portion of the building to extend the entire width and large enough for furnace, and proper storage room. I would like to build a little wider than 24 ft., but I have the joists—lower and upper—to conform to a building 24 ft. wide.

The building is to face east and west on a corner and will have east and south fronts. No one will build south of me, as that is to face on the new State road and railroad grounds. It is a new country town just starting. The town will probably never be anything but a small place and perhaps a one-story structure will answer the purpose. The lots are 140 ft. deep.

I might mention that I want the basement to be water-tight, as water comes within 18 in. of the top of the ground.

Will some of the practical readers make suggestions as to how I can best carry out my scheme?

A Question in Floor Construction

From L. S., Dixon, Ill.—I would like to hear from some one of the readers of THE BUILDING AGE as to what they think of ⅜-in. oak flooring in a church laid over a good level sub-floor with felt between.

Removing Linseed Stains from Marble

From C. C. H., Brookville, Pa.—Will some of the practical readers of THE BUILDING AGE who have had experience tell me what will take linseed oil stains out of marble?

Illinois Board of Examiners of Architects

At the recent State Convention of Illinois Architects, a report was presented showing some of the work which had been accomplished by the State Board of Examiners of Architects. It showed that licenses had been granted to 982 architects, of which 417 are Class "A," and 565 are Class "B." It is interesting to state that Class "A" are those architects who received their licenses when the law went into effect. At the present time there are only nine more architects holding licenses in the state than the total number a year ago.

Carpenters Rebuilding Oil Rigs

Carpenters and mechanics for heavy work have been in demand of late in the California oil fields, where every effort is being made to rush the reconstruction of oil-well rigs blown down in recent storms. Enormous damage was done all over the Coalinga and Kern oil districts about the middle of January. Reconstruction was started immediately, and many rigs were rebuilt when that section was visited by another storm on Jan. 28-29, even more violent than the first. Considerably over a thousand well rigs were overturned and demolished, in addition to the destruction of large numbers of bunkhouses and other light buildings. The rush of rebuilding used up all the lumber of the sizes needed on hand in the South San Joaquin Valley, many of the yards being kept open day and night for some time, and heavy shipments were rushed down from the Oregon and Washington mills.

Competition in Workingmen's Houses

A competition in houses for workingmen involving plans, sketches, grouping and arrangement has been announced by the National Americanization Committee with the co-operation of various societies and institutes of architects and engineers. Prizes aggregating $2,100 are divided into two groups, the first of which covers plans for the housing of workmen in industrial communities not exceeding a population of 35,000. Entries of this class include plans for: First, single family houses; second, combined family and lodging houses which will permit separation of the family from the lodgers; and third, boarding houses or community dwellings for numbers of single men or of single women.

In the second group two prizes are offered for a satisfactory substitute for the derailed freight and cattle cars now used to house construction gangs on railways.

The aim of the contest is to arouse interest in the subject of the housing of workmen in industrial communities and to produce carefully worked out and entirely practicable housing plans and standards which it will be possible for employers and workmen and communities alike to demand and insist upon.

Inquiries concerning the competition should be addressed to the National Americanization Committee, 20 West Thirty-fourth Street, New York.

The Cost of Using Steel Forms

When steel forms are leased and returned they cost 30 cents a square foot, according to Leonard C. Wason of Boston. With wood, on the average, 3 cents per superficial foot of contact is the cost when used four times. Thus it is necessary to use steel forms ten times to bring the average material cost down to that of wood. But with wood the forms are so much shaken and damaged that after three or four uses they are practically worn out and have to be replaced. Steel forms have been used more than thirteen times on one job.

"We have never used steel forms to destruction," says Mr. Wason, "although we have used them thirty times. Probably forty-five uses is a conservative estimate of their life. During this period 3 cents per square foot may be spent for upkeep, and when they are worn out the same 3 cents can be obtained from the metal as junk. If the forms are bought at 45 cents a square foot instead of leased at 30 cents the cost per use would work out finally at 1 cent, to which should be added ½ cent for wedges and keys. This total is just half the cost of wood."

Waterproofing Backs of Wood Finish in Concrete Buildings

In connection with the wood finish of some concrete buildings on the Pacific Coast trouble was experienced by a California builder with the moisture coming out of the cement and warping the woodwork, and request was made of *The Painters' Magazine* for a formula for a paint that would waterproof the back of the wood finish

The following reply was furnished by the magazine in question:

"The very best and probably the only means to keep the wood from being affected by the moisture coming from the source mentioned is to dissolve one part by weight of paraffin wax in two parts by weight of heavy coal tar oil, also known as heavy naphtha, which is readily obtainable in your State. As paraffin wax has a melting point between 118 deg. and 130 deg. F., the solution can be made by steam heat without fire risk. It should be used fairly warm and several applications made.

"However, even by the use of this moisture-shedding preparation, you cannot guarantee to keep the wood from warping, when the walls are not entirely dry or when moisture percolates through from the exterior of the walls. Even if the walls were waterproofed on the inside by painting, the moisture coming through from the outside is apt to throw off the paint back of your wood finish."

The House of Seven Gables

This old house, which is one of the show places of Salem, Mass., and was made famous by Nathaniel Hawthorne, overlooks the harbor, with a view of Marblehead in the distance. The house faces the south. Its east end borders on Turner Street, crowding down so close to the sidewalk that the picturesque sign over the shop door swings just over the heads of the passersby. The steeply sloping roof of the ancient mansion, its sharp-pointed gables, its gray weather-beaten clapboards, the faded red of its brick chimneys all attract the visitor who journeys to this historic house.

The house was built in 1669 by John Turner, a Salem merchant. The third John Turner sold the house in 1782 to Captain Samuel Ingersoll. Mrs. Ingersoll was a Hawthorne and a cousin to Hawthorne's father. The house is a picturesque clapboard house and its many gables add interest and quaintness to its composition.

The State College of Forestry at Syracuse, N. Y., has just announced plans for the annual lumber trip which is restricted to members of the Senior Class of the College taking general forestry and which amounts to a month of study in the woods of methods of logging and saw-milling. This is an annual event looked forward to by all of the boys, as it offers unusual opportunities for learning the practical features of the lumber industry, the theoretical side of which is studied at the college in Syracuse. The trip includes a very careful analytical study of methods and efficiency secured in various logging and milling operations.

According to the Chamber of Commerce Oakland is the only city on the Pacific Coast from British Columbia to Mexico to show an increase in building operations for 1915. The average decrease in the amount of building in Pacific Coast cities for the year was 35 per cent and a fraction. Oakland, however, shows a gain for 1915 of $327,769.24, or approximately 7 per cent over the previous year.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

WHEN the shape of a beam resembles the shape of the bending moment diagram the stress is the same along the length. When the top and bottom of a beam are parallel the stress diminishes toward the ends. Cast iron beams therefore are generally made with a "belly" for the material can be distributed at will since the beam is cast in a mold. This effects some saving in the cost of patterns and castings. Plate girders are sometimes made in this form, a familiar example being the main girders along the underside of railway cars. The stress equals the moment at any point divided by the depth of the beam at point.

Trussed Beams

The trussed beam shown in Fig. 59 is the most simple form of truss. One-half of a uniformly distributed load is assumed to be concentrated over the strut in the middle, so, letting $P = \frac{W}{2}$

$$M = \frac{P}{2} \times \frac{L}{2} = \frac{PL}{4}$$

Referring to Figs. 37, 38 and 39, wherein the stress is shown to be equal to the moment divided by the depth, the compressive stress in the long horizontal member is,

$$C = \frac{PL}{4} \div d = \frac{PL}{4d}$$

The length of the diagonal portion of the tie is found by the formula

$$t = \frac{\sqrt{L^2 + (2d)^2}}{2}$$

and the tensile stress in the diagonal is

$$T = \frac{Pt}{2d}$$

The compressive stress in the vertical strut depends upon the construction of the horizontal member. If it is in two pieces joined over the strut, one-half the load, P, is carried by the strut. If it is in one piece, or composed of several planks so joined that they act as one piece, the strut carries $5/8P$ when P is a single concentrated load or $5/4W$ when W is a uniformly distributed load. This value must be used for P in the above formulas.

When the single strutted beam carries a single concentrated load over the strut the latter carries the whole load, plus half the weight of the uniformly distributed load of the beam. The tensile and compressive stresses in the horizontal and diagonal members are found as explained above.

In Fig. 60 is shown a beam with two struts at the third points.

The bending moment for a beam carrying two equal loads, P, at a distance $= L \div 3$ from each end, is

$$M = P \times \frac{L}{3} = \frac{PL}{3}$$

The horizontal stress, $C = \frac{PL}{3d}$

The diagonal stress, $T = \frac{Pt}{d}$

The compressive stress in each strut $= P$.

When the load is uniformly distributed one-third

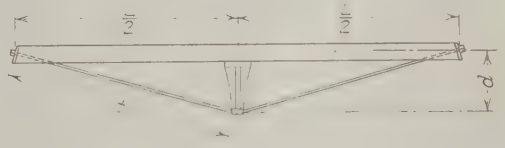


Fig. 59—A Single Trussed Beam

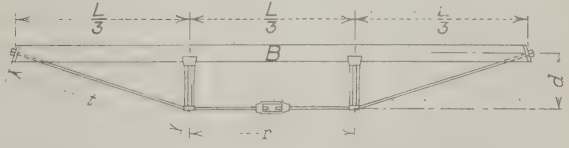


Fig. 60—Design of a Double Trussed Beam

is carried by each strut, so in the above expressions substitute $W/3$ for P.

When the horizontal member is in one piece and uniformly loaded each strut carries eleven-thirtieths of W.

The above formulas are true for any depth of truss of the single or double strut kind. The truss may be reversed so the sloping members are above and the long horizontal member is below. Then the lower member carries tension and the upper members are in compression. The methods of computation are not altered except that the vertical pieces are ties instead of struts. With the load applied at the upper end the ties carry no stress from the load but are used merely to maintain the horizontality of the lower chord. With the load

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 53 of the February issue.

applied at the lower end each vertical carries the amount it would carry if the beam were inverted. With a double tied beam the tie serves to hold the frame together in case of a rolling load, or a load applied other than vertically, in which case it does carry stress. Diagonal counters set between the ties will take care of such stresses and the ties merely serve to hold the frame together. It is advisable to have ties many times in trusses when an analysis shows they are not stressed, in order to carry the weight of the lower chord. If the lower chord must carry all of its own weight or any load between supports, bending and shearing stresses will be set up in the lower chord in addition to the direct tensile stress. This is one reason for making all tension members of metal when possible.

Dimensions are on center lines. The tension rods should go through the ends of the compression member at the neutral axis. The plates at the ends should be normal to the direction of the tie. The area of each plate is obtained by dividing the tension in the rod by the allowable safe unit compressive stress on the end of the wood.

The area of each strut is obtained by dividing the compression in the strut by the safe unit compressive stress in the material of which it is made. The area of the end of the strut against the wood is found by dividing the compression in the strut by the allowable safe unit compressive stress across the grain of the wood.

The size of the long compression member is obtained by designing it as a column, plus the effect of bending caused by whatever load it may carry as a beam, with spans figured between end supports and vertical struts, or ties. The unit compressive stress on the end of wood may be used when the length of the member between supports does not exceed fifteen times the least thickness. For longer pieces the unit compressive stress must be reduced by an appropriate column formula.

The sizes of metal tension members are fixed by dividing the total tension by the allowable safe unit tensile stress in the metal used. If threads are cut in a rod this size must be at the root of the threads. If the rod has upset threads the full area of the rod may be used. The minimum size rod to use in any tie is ⅝-in. diameter.

The size of a tension member made of wood is obtained by dividing the total tension by the allowable safe tensile stress in the wood and adding thereto an area equal to that caused by bolt holes and seating of other truss members.

(To be continued)

Building Outlook in New York City

In its first issue for the new year, discussing the outlook for 1916 in the building trades, the *Record and Guide* presented expressions of opinions from contractors in a position to know the trend and outlook for the future. It said:

"Among the general contractors in this city there is a strong feeling of optimism in regard to the outlook for an active season in 1916. Many operations which have hung fire for a year or more are becoming active now, and the prospects for much additional work are better than they have been for a period of years. The activity extends to all lines of the building trades and all should reap the benefit of the increased prosperity of the country at large.

"There is still a demand for high class apartments and for accommodations in loft buildings, and the erection of buildings of these types will be a prominent feature of the construction work for 1916.

"The excellent condition in financial circles and the large amounts of money made by industrial corporations during the last year have released great sums to be utilized for the construction of new buildings. If this condition continues, and there is every indication that it will, the building trades in this country, and particularly in the Metropolitan district, should enjoy one of the most prosperous years in the history of the business."

The Complete Building Show

A very large and attractive exhibit of building material, known as The Complete Building Show, was held in Cleveland, Ohio, Feb. 16 to 26. This exposition was the first of its kind ever held in this country, having been inspired by the Building Trades Exposition of London, England. The exhibit was designed to interest the architect, builder, material dealer, manufacturer and the man who might be contemplating a house of his own.

The show was educational in character and included nearly 150 exhibits, covering about every kind of material and equipment for any building from a skyscraper to a garage. The displays included iron, steel, brick, tile, wood of all kinds, cement, lime, asbestos, sheet steel, expanded metal, and devices for safety and labor saving. More than fifty lumber dealers and manufacturers united in an exhibit of woods and their uses, showing woods from all parts of the world. Makers of hollow tile showed, in completed sections of houses, the various ways in which tile may be used in building construction. Every possible use of electricity in the home was also shown.

The exhibit attracted a large number of visitors, including many from other cities. While the show was in progress the annual conventions of the National Builders Supply Association and of the National Brick Manufacturers Association were held in Cleveland, in addition to meetings of several State supply associations.

Bungalow on Roof of Office Building

Mention has been made in these columns from time to time of unique features of the roofs of some of the commercial buildings in New York City, but this novelty is not confined to the eastern Metropolis, for one of the latest developments is a bungalow or cottage on the roof of the fourteen-story Railroad and Bank Building recently completed at St. Paul, Minn. The cottage is 40 x 40 ft. in size with a living room, or rest room as it might be called, 40 x 24 ft., besides two bed rooms. The rooms are intended for meetings of directors and the bed rooms for those directors from out of town who may attend. The ground plan of the commercial building is 290 x 232 ft.

Chicago's Ninth Annual Cement Show

The Extent and Variety of the Exhibits Rendered the Affair an Education for the Interested Visitor

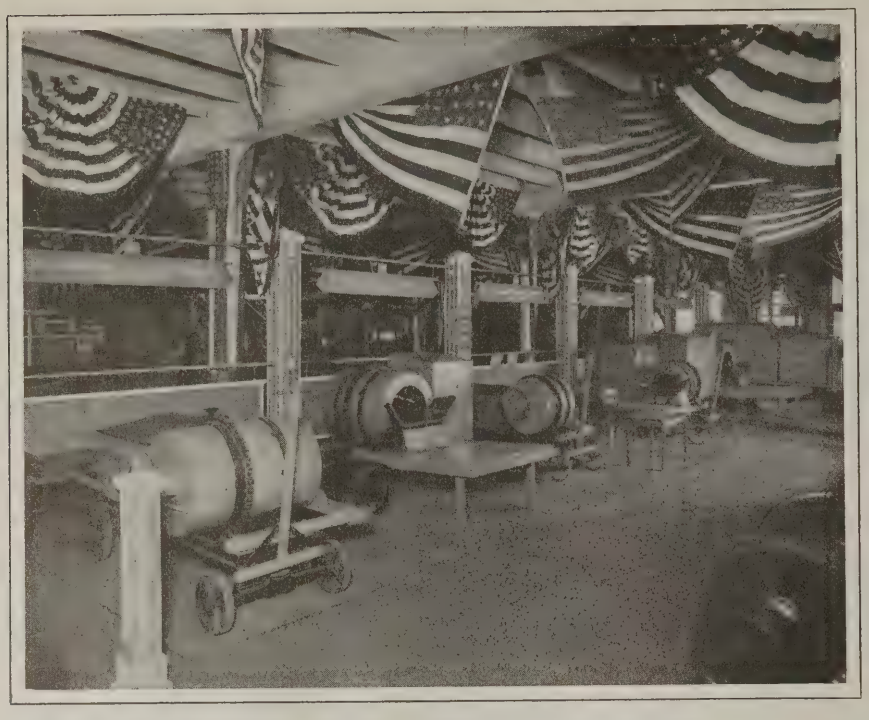
THE ninth annual Cement Show, held in Chicago Feb. 12-19 inclusive, was acknowledged to be the largest and most successful exposition ever held in the interests of cement and its affiliated industries. It eclipsed its eight predecessors in every department from the character and number of exhibits, floor space occupied and the attendance of contractors and builders, architects and engineers from all parts of this country and Canada. So great was the demand on the part of the manufacturers for exhibit space that the Coliseum and Annex were insufficient to accommodate them, necessitating the leasing of the First Regiment Armory, which is close to the other buildings. Not a vacant booth was to be found in these three commodious structures, a fact which in itself is conclusive evidence that manufacturers of machinery and materials consider the Cement Show the premier event of the year.



Interior View of the Chicago Coliseum During the Progress of the Cement Show

Being held at a time just preceding the opening of the building season, the Cement Show is recognized by progressive contractors and builders as an exceptional opportunity to investigate the improvements which have been made in modern equipment and products. They feel the necessity of meeting men who are cognizant of cheaper and more efficient methods of accomplishing certain results. They seek new ideas in home and farm building construction, realizing that it is only by heading the procession in their communities that they can retain their reputations as leading builders. Those who visited the show this year were not disappointed in their expectations, and they returned to their homes with the satisfaction of knowing that the time and money they spent were investments which will produce exceptional dividends in new and more desirable business during 1916.

Not alone was cement itself shown in its many ornamental and useful functions, but also in wide variety the machinery, tools and appliances wherewith it is transformed into the permanent concrete structures which are seen on every hand.



CHICAGO'S NINTH ANNUAL CEMENT SHOW. ONE OF THE MANY ATTRACTIVE AND INSTRUCTIVE EXHIBITS OF CONCRETE MIXERS

Auto trucks are proving their worth in the contracting field as a successful medium for reducing hauling costs, and many manufacturers were on hand exhibiting new models, some of which were of the self-dumping type. One company which builds both mixers and barrows recognizing the need for a barrow which would make for more uniform batches as delivered to the mixer hopper included in its display a new barrow having a fixed capacity.

When City Prosecutor Harry B. Miller, representing Mayor William Hale Thompson, officially declared the exposition open on Lincoln's Birthday, Sat., Feb. 12, a flood of light revealed the Coliseum handsomely decorated and all exhibits in working order. Hundreds of American flags hung suspended from the ceiling. Concrete mixers, tampers, and other equipment were working to beat Biefield's band, which played popular and National airs throughout the day. The booths were made attractive with columns of gray and white, graced on the top with spreading ferns, and the gilded bars which separated the exhibits reflected an atmosphere of prosperity.

The signs which were nailed to the balcony of the Coliseum and Armory called to mind the wonderful progress made in the cement industry in the past thirty-five years, the manufacture of Portland cement now ranking as sixth in the list of American industries.

During that comparatively short period of time the annual producton has jumped from 42,000 bbl. to over 90,000,000 bbl., a truly stupendous achievement! The reason for this wonderful growth is that year after year the adaptability of concrete to the uses of mankind has become more and more generally recognized. In the cities the earth is hermetically sealed with it. On the farm, as a road surfacing material, and for thousands of other uses the slogan, "Concrete for Permanence," has a significant message which speaks for itself.

About two hundred manufacturers were present with a wide variety of equipment and materials, each occupying one or more spaces. So great was the noise caused by practical demonstrations of concrete mixers, tampers, etc., that each alternate half-hour was observed as a period of quiet. On various occasions the proceedings were enlivened by Biefield's Band, which played at stated intervals during each afternoon and evening.

A radical departure from former shows was found in the effort of the cement industry to demonstrate in one exhibit the achievements in the principal fields of concrete construction. To this end thirty cement companies, shipping cement within 1000 miles of Chicago, entered into an agreement for the installation of a most exhaustive educational and creative exhibition of cement ever attempted. It enabled architects to see in it the possibilities of concrete as exemplified in a bunga-



AN EXHIBIT EMBRACING A MILWAUKEE 16 PAVER WHICH WAS THE OBJECT OF MUCH COMMENT ON THE PART OF THE MANY INTERESTED VISITORS

low of the unit construction. The bungalow was designed by a leading Chicago architect. Its walls were built of Hydrostone blocks, faced both inside and out, thus eliminating all plastering work. On the exterior the finish was a combination of mica spar and white cement, while the interior decoration consisted of white cement mixed with an aggregate of verona marble flakes. A number of transparencies were shown of the Edison fire to demonstrate the fireproof qualities of concrete construction.

Beauty and utility are often combined most successfully, and some new effects in concrete wall surfaces were shown to great advantage. Builders were also presented with examples of the best skill of the concrete products manufacturer in fence posts, blocks, tile and many other products closely associated with the building art.

That there is a broad field for contractors whose transactions are mostly confined to the rural districts was effectively demonstrated in the joint exhibit, and opportunities for profitable expansion were shown in many interesting ways.

In one section, for example, a number of blue prints gave practical designs and details of a wide variety of buildings. These included such structures as ice houses, smoke houses, milk houses, pergolas, septic tanks, and buildings for housing live stock. Small models of several types were installed on a revolving slab, showing how effectively silo forms may be used for construction work on the farm.

Another booth was set aside for practical demonstrations of the use of wooden forms in the manufacture of solid concrete blocks, with some attention being also given to the methods employed in decorative surfacing. A separate exhibit was devoted exclusively to the decorative and structural use of concrete, and many examples displayed on the floor had features of exceptional interest. Still another department demonstrated the importance of using clean, graded aggregates, and it was shown conclusively that dirty materials will not make first-class concrete, either from the standpoint of strength or appearance. An attractive booth was also fitted up to demonstrate the advantages of concrete as a surfacing material for roads, streets and alleys. There were several interesting models which showed work in various stages of construction, and so forth.

Three large spaces were devoted to a display of work of many Illinois architects, consisting of



Chicago's Ninth Annual Cement Show—Handsome Mantel and Fireplace Executed in Concrete

bungalows, residences, apartments and industrial buildings.

A moving-picture exhibition was also part of the Armory attractions. Through the courtesy of the Portland Cement Association, a two-reel comedy, entitled "A Concrete Romance," was run periodically every day.

Quite a number of visitors took advantage of the offer of the Universal Portland Cement Co. to visit the company's plant at Buffington, Ind. Two trips were made each day, one in the morning and the other in the afternoon, each inspection consuming one-half day.

Several important conventions were held while the Cement Show was in progress, notably those of the American Concrete Institute, the National Conference on Concrete Road Building, the American Concrete Pipe Association, the National Association of Mixer Manufacturers and the Illinois Lumber and Builders' Supply Association. A conference of building inspectors was also conducted, which was attended by inspectors of forty of the larger cities in this country. This meeting was of a most interesting character, and comprised a discussion of building codes, methods of inspection and other live topics bearing on the conduct of a modern city building department.

Antiquity of Glue and Veneering

Among the many occupations of the carpenter, that of veneering is noticed in the sculptures of Thebes as early as the time of the third Thothmes, who is supposed to be the Pharaoh of the Exodus, and the application of a piece of rare wood of a red color to a yellow plank of sycamore or other ordinary kind is clearly pointed out, says a writer in a Londan contemporary. In order to show that the wood is of inferior quality the workman is represented to have fixed his adze carelessly in a block of the same color while engaged in applying them together. Near him are two other men, one of whom is employed in grinding something with a stone on a slab, and the other is spreading glue with a brush. It might, perhaps, be conjectured that varnish was intended to be here represented, but the appearance of the pot on the fire, the piece of glue with its concave fracture, and the workmen before mentioned applying the two pieces of wood together, satisfactorily decides the question and attests the invention of glue over 3000 years ago.

The Need of Trained Men

The greatest need in each and every line of business in the United States to-day is trained men, is the opinion of Dr. Pratt, chief of the Bureau of Foreign and Domestic Commerce, and honorary vice-president of the Foreign Trade Council, who made an impressive address at the recent convention of the National Foreign Trade Council held in New Orleans. This need, he pointed out, is especially true in foreign trade because of two facts which must be recognized and taken into consideration in any practical plan for equipping men for foreign trade work. "We must recognize the fact that this country is not specialized in foreign trade and hence the demand for qualified men, not having been widespread, as in the past has not aroused general interest. Another reason why we lack men trained for foreign trade is the barrier of language. Practically every European business man does an international trade and needs languages in his everyday work. The very isolation of our business, which in some ways is not to be regretted, has prevented us, and will continue to prevent us—unless we make special efforts—from overcoming the handicap of language.

"The quality which I would place first among those needed in foreign trade is resourcefulness, then adaptability. The man to make a success in foreign trade must be more than a salesman. The man whom the American concern can afford to send out of the country to develop its foreign business must be a business diplomat—one who can represent creditably his concern and who can give his firm prestige in a country where the heads of the business are personally unknown."

Tearing Down Class "A" Building

The largest Class "A" building in San Francisco thus far to be demolished to make room for a larger structure is a six-story structure adjoining the Spreckels building at Third and Market Streets, known as the Spreckels annex. The original plan was to add two stories to the old building, first raising the various floors to correspond with those of the larger structure adjoining, making it possible to throw the two together and save the space now used for elevators in the smaller building. On stripping the columns, however, it was found that an offset in one of the walls made the proposed change inadvisable, and J. R. Miller, the architect in charge, decided that it would be cheaper to wreck the old building entirely and rebuild than to make over the old structure.

Not Liable for Result of Joke

A decision recently rendered by the California Industrial Accident Commission, by which the employer is declared free from liability for the result of a practical joke played by a workman during working hours, is of considerable interest to building contractors in localities where employers' liability laws are in force. The workman claiming compensation was employed in cleaning out a kiln of the California Pottery Company of Oakland, Cal., when a fellow workman, as a joke, turned a hose on him. The water, unknown to the joker, was scalding hot, and disabled the victim for a period of forty-five days. In denying his claim, the commission decided that he did not receive his injuries from an act growing out of his employment.

Among the building improvements planned for Mount Vernon, N. Y., is a factory, 83 x 153 ft. in plan and two stories in height. It will follow regular mill construction lines and be covered with a slag and felt roof. The contract has been placed with J. W. Ferguson Company of New York City and Paterson, N. J.

Building Methods and Millwork

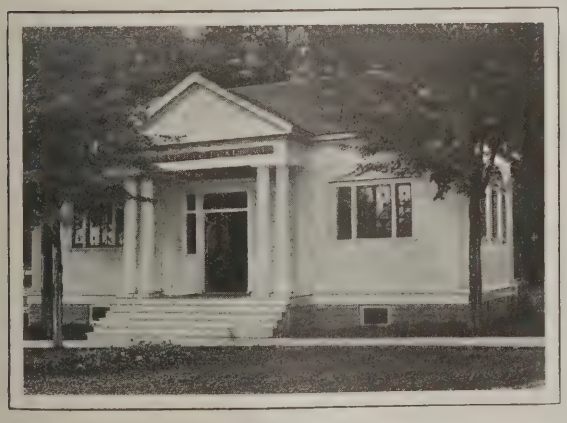
Some of the Old-Time Methods of the Carpenter and the Builder Contrasted with the Present

By George E. Walsh

TIME is money for the carpenter and builder as well as for the business man, and efficiency in all construction work to-day means such a close organization of forces and workmen that a building can be put up in the least possible time without friction or interference of one set of workmen with another. In our large cities, where millions of dollars are invested in a single structure, the outlay of capital is so great that a delay of six months in finishing a building means a considerable loss of money to the investors. The most successful builders are, therefore, sought who can do a given job in a short time and turn the structure over complete to the renting agent.

The small builder and carpenter have to a certain extent adopted somewhat similar methods of building. Only recently a frame church was started and completed within three days, and a house was finished and the family ready to move in within twenty-four hours after work was commenced. These, of course, were emergency orders, and were worked out with the idea of seeing how quickly a frame structure could be put up.

To the old-fashioned carpenter and builder of fifty years ago such a performance would seem little short of the miraculous. In those early days house-building was a slow and serious undertaking. Practically everything was made on the site by the slow, laborious process of hand labor. Everything had to be cut and made by hand, from the doors and window frames to the stairs and newel posts.



A Small Library Made of Mill Stock Sizes for Windows, Doors and Porch Columns

Perhaps there are a few carpenters living and working to-day who can remember when mill-work was an unknown factor in the building situation, and it took a good carpenter the greater part of a day to make a door or a window frame. There was no place where orders could be given for the manufacture of stock goods, and even the mantlepiece had to be fashioned and made by the man on the job. The building of an ordinary frame structure then required many months, and sometimes a year or two marked the limit.

We have grown more and more dependent upon



A Low-Cost Chapel Made Entirely of Regular Mill Stock Material and Giving a Very Attractive Effect

the mill for certain stock fixtures. No carpenter to-day would think of making doors and windows by hand, as they can be manufactured at the mill in one-tenth the time and at one-fourth the price. When the mills began to make stock doors, windows, newel posts and other needful things, a period of imitation set in. There was no longer individuality of construction that marked the early buildings. Each builder would, before that period, design and fashion his doors, windows, newel posts and mantlepieces to suit his own fancy, and repetition of designs was far less than when the mills began to make them.

The woodworking plants could not afford to make a great variety of stock. Only a few sizes were made and carried, and every architect and builder had to adapt his designs to fit these stocks. A mill would work up a lot of stock doors and windows during the dull months and store them away for the busy season, confident they could dispose of them. This kept the mill going the year round and tended to cheapen the cost of production.

But this had a fatal influence upon the building operations of the day. It made for uniformity and monotony of appearance. The owner of a house would find his doors and windows imitated by all his neighbors. Even his moldings and interior trim were the same as in nearly every other house.

It has only been in recent years that the mill work industry has changed and attempted to meet the pressing needs of the day. People got tired of

the sameness of construction, and there was a demand for a change. Architects began to design their own windows and doors, but when these were sent to the mills the cost was almost as great as if hand made. But the demand for new styles became imperative, and the mills had to specialize on these particular orders. New machinery was introduced, and really complicated designs were executed for those willing to pay for them.

A Change for the Better

But a more noticeable change for the better has now come about. The mills, instead of sticking to a few stock sizes and designs, have begun to take notice of changing styles and to manufacture in large lots the latest thing in mill work. They have entered upon a specializing work that is apparent in many ways. Instead of sticking to a few old stock sizes that were popular fifteen or twenty years ago, they are making and carrying in stock a great variety of the newest things.

The carpenter and builder are learning therefore to depend more and more upon the mills, and as a result they are becoming more assemblers than builders. For instance, the mill work of a modern frame structure to-day represents more in expenditure than the carpenter's work on the site. If the carpenter's bill reaches $1,500 for the whole job, the mill work will cost $2,000 to $2,500.

This is in line with modern progress. The mills, with their machines, can cut and plane lumber much quicker and cheaper than carpenters can do it by hand, just as they can make doors and windows at half the price formerly required. The builder who depends upon the mill for the greater part of his stock work can construct cheaper and quicker than another who has the work performed by hand on the site. On the other hand, the mills which give most of their attention to the ordinary stock sizes, without considering the improvements being made, run a great risk that may prove costly in the end.

Improving the Quality of the Finish

Not only are the mills engaged in increasing the size and variety of their stocks, adopting new styles as fast as they become popular, but they are improving the quality of their finish. Green lumber or inferior kiln-dried stock are mostly avoided by the reputable mills, for owners and contractors will not tolerate such material. Stock material to-day is up to the standard of what is commonly called the best, and the finish is made perfect.

Take stock doors as an illustration. The best of these are veneered, with a core of pine because of its lightness and non-warping properties, but this core is not made of a solid piece of pine but of narrow strips of wood with pieces of hardwood at the edges. These pieces are fitted with tongue and groove or dovetailed, and when glued together subjected to great hydraulic pressure to secure a perfect joint.

The veneers are made from a great variety of hardwoods, and are often one-quarter of an inch thick. The best veneers are rotary cut to bring out the beautiful figure and grain, and when polished they have a finish unsurpassed by anything made entirely by hand. The greatest variety of patterns and styles of doors made with hardwood veneers of all our known choice woods are turned out by the mills, and the architect can find among these stock veneered doors just what he needs to finish off his Colonial, Gothic, Italian or old English house. So he patronizes stock doors just because the mills have followed him in his profession and tried to meet, if not anticipate, his wants.

Stock Mantels

The same is true of the stock mantels. It was not many years ago that stock mantels were confined almost entirely to cheap houses. They were as cheap in looks as in price. The builder who was constructing a house of any pretensions had to design his own mantels or appeal to the architect to make them for him. The architects began designing strictly Colonial or old English mantels, and the mills began to realize that they would have to improve their stock or lose trade. Some of the more progressive ones employed architects to make designs for them, and a new list of stock mantels was made and other drawings were shown for immediate execution on order. With the machinery on hand it was not a difficult matter to execute an order as needed at only a slightly increased price over the regular stock.

The up-to-date woodworking mill is of the greatest help to the small builder and carpenter as well as to the big contractor. If the carpenter is depending upon his own skill and knowledge in planning and constructing a house, he may at times be at a loss just how to design a strictly Colonial or Gothic door, window or mantel. If so he has merely to go to the mill and choose from samples. These samples are strictly correct, having been designed by professionals, and the carpenter can feel that he is carrying out the lines of his order even in the smallest detail. He orders his mill work with an assurance that he is saving time and trouble, and that it will give satisfaction to the owner.

Thus even the small carpenter and the builder are becoming a good deal of "an assembler." He orders mill work more and more each year, and has less and less executed on the building site by hand. Stock sizes of molding, lumber and other pieces are ordered to suit his needs, and the waste grows less and less. The waste, if any, is at the mill, and there waste is reduced to a minimum because of the ability to use small ends and odd lots in the manufacture of other articles.

Quicker Construction

These changes in the building world make for quicker construction work, and the more the small builder imitates the big construction companies of the cities in availing himself of mill stock the more expeditiously can he put up a structure. Time counts with him, too, and he cannot afford to drag behind and cling to old methods. The builder who can put up twenty houses in a year makes a better income than the one who builds five or ten. To do this he must know how to build his house first on paper and then order from stock as much of the material as he can use, having it delivered at specified dates. Then with a sufficient force of men on hand he can put up a structure in half the time that his forefathers did.

Meeting of New York State Builders

A Well Attended Convention—Important Topics Discussed —Work of Legislative Committee—Election of Officers

THE twentieth annual convention of the New York State Association of Builders was held in the rooms of the Building Trades Employers' Association in The Builders' Exchange Building, West Thirty-third Street, New York City, on Jan. 25 and 26, there being present ninety-five delegates representing twenty different cities and twenty-four different organizations.

The first business session was held on the afternoon of Jan. 25, the delegates being called to order by President G. C. Norman of New York City, after which William Crawford, president of the Building Trades Employers' Association, extended a welcome to the delegates in behalf of his organization.

List of Delegates Present

The roll-call showed the following delegates in attendance:

Albany—W. G. Sheehan, Jno. Dyer, P. Welch, J. Bame, E. A. Keeler, L. Strauss, M. Mead, J. J. Finn, L. J. McCann, W. S. Hamill, J. F. Stone.
Amsterdam—H. C. Griene, C. B. Machold.
Auburn—R. C. Hall.
Binghamton—H. E. Ford.
Buffalo—F. L. Beyer, J. M. Carter, B. I. Crooker, J. G. Davis, C. Diebold, T. M. Dyer, M. G. Farmer, H. M. Feist, Mr. Fuller, W. F. Felton, G. J. Hager; J. W. Henrich, A. I. Holloway, W. G. Houck, D. Hyman, G. C. Schierer.
Corning—M. E. Gregory, J. W. Shea.
Elmira—C. A. Pulford, J. M. Cunningham, Verne G. Wells.
Ithaca—D. Driscoll, J. Campbell, E. H. Hulbert.
Kingston—J. A. Campbell.
Mt. Morris—C. A. Foote.
Mt. Vernon—J. D. Lapage, O. J. Hayen, A. S. Jenks.
Olean—B. U. Taylor.
New York City—L. Harding, F. Youngs, Mr. Whitney, Wm. Crawford, F. Tuttle, G. C. Norman, M. Webb, Mr. Crane, J. O'D. Whitenack.
Rochester—F. Elain, A. J. Mahon, W. A. Freiderich, G. A. Swan, H. J. Karaveck, L. S. Whitmore, R. Williamson, C. W. Luther, J. W. Beinsheim, J. L. Stewart, C. Harper, H. Stallman, H. C. Peck, W. Blair, F. H. Phelps, F. Gould, T. Swan, J. L. Freiderich, J. Luther.
Syracuse—C. Ciccaralli, J. R. Pierce, D. W. Nicholson, R. A. McHale, E. K. Fenno, H. P. Warner.
Schenectady—Thos. Brown, P. H. McDermott.
Utica—Geffory Griffith.

President Norman's Report

President Norman read his annual report, which dealt with the work of the State Association as well as that done in co-operation with the National Association of Builders' Exchanges in amending and advocating the use of the new Standard Form of Contract. Following this report it was recommended that the New York State Association of Builders advise all affiliated organizatons and individuals to use this Standard Form of Contract, as prepared by the American Institute of Architects in conjunction with the National Association of Builders' Exchanges.

The report of Secretary James M. Carter of Buffalo covering the general condition and finances of the Association in detail, showed a normal growth and healthy condition of the organization.

E. A. Keeler of Albany, Chairman of the General Welfare Committee, presented a report touching upon the work of the committee and the general welfare and membership of the State Association during the past year. Following this report several applications for membership were submitted.

President H. L. Lewman of the National Association of Builders' Exchanges, Louisville, Ky., was scheduled for an address on "The New Standard Form of Contract," but not being able to be present the address was read by Commissioner I. H. Scates of Baltimore.

Report of Counsel

The second business session of the convention was held from 10 a. m. to 1. 30 p. m. on Wednesday, Jan. 26. At this time the report of Counsel Eidlitz & Hulse of New York City was submitted, covering the legislative work of New York State Association of Builders during the session of the Legislature of 1915 and the session of the Constitutional Convention from April 6 to Sept. 10, 1915. During the four and one-half months of the 138th session of the State Legislature there was introduced a total of 3356 bills of which 956 passed both houses. Of these bills 197 were vetoed by the Governor. Thirty-two others were returned with the disapproval of the mayors of various cities, but two were passed over the mayors' veto. The titles and digests of all the bills introduced in the Legislature were examined by the committee and 101 bills appearing to directly affect the interests of the members of the New York State Association of Builders were examined and considered in detail. Of the bills approved several passed both houses only to be vetoed by the Governor, and others are now laws. Of the bills opposed by the Legislative Committee none was enacted into law.

Work of Legislative Committee

Robert Christie, Chairman of the Legislative Committee of the Building Trades Employers' Association of New York City, submitted a report touching on the number of bills considered by the Legislative Committee during the past year and gave the results of the committee work for the past five years. The number of bills presented was 529; those opposed were 214 and those indorsed numbered thirteen. Two were referred to the General Contractors' Association, fourteen were referred to Counsel and on sixty-five no action was taken. Altogether 418 bills were considered and action taken thereon.

The next order of business was a very comprehensive address by I. H. Scates, Commissioner of the National Association of Builders' Exchanges, who took for his topic "Work Done by and Development of the National Association."

Officers for 1916

The officers for 1916 were then elected, resulting in the following choice:

President.....M. E. Gregory, Corning
1*st Vice-Pres*.....E. A. Keeler, Albany
2*nd Vice-Pres*.....G. C. Schierer, Buffalo
Sec'y-Treas.....James M. Carter, Buffalo
Counsel.....E. F. Eidlitz, New York City

Louis Harding of New York City was reappointed Chairman of the Executive Board.

Following the business session the delegates had as their guests at a luncheon the officers of the Building Trades Employers' Association of New York City.

In the evening the delegates of the New York State Association of Builders were the guests of the Building Trades Employers' Association of New York City at their annual banquet held at the Biltmore Hotel.

Advance in Cost of Blue Prints

According to present tendencies it would seem that the price of blue-print paper and blue prints is likely to advance in the near future, due to the increase in the price of all chemicals used in the blue-print process, as well as to the heavy advance in paper. As is well known, blue-print paper is coated with an emulsion of iron and potash salts, which are combined by the action of light, and upon immersion of the paper in water the coating is precipitated on the surface of the paper in the form of Prussian blue.

According to the New York *Commercial*, red prussiate of potash, which is the form of potash used in the blue process, has been made exclusively in Germany. Before the war it sold for 19c. a pound; to-day it is practically unobtainable at $7 per pound, or an advance of 3500 per cent. Citric acid, from which the citrates of iron and ammonium are made, has advanced 150 per cent, and oxalic acid from which the oxalates of iron are also made has advanced 1000 per cent in the same time.

Will Sell Sand by Cubic Measure

Owing to the discovery that sand sold by weight contains a large and varying amount of water, the California Superintendent of Weights and Measures is preparing to issue an order establishing the sale of sand for building purposes by cubic measure.

Changes in Lumber Rates

For several years the importation of oak lumber for finish, etc., from Japan, has been a feature at Pacific coast ports. To permit Eastern hardwood lumber to compete with the imported wood, the transcontinental railroads have announced the following reduction from Eastern common points to this coast: From Cincinnati, Detroit and Birmingham, 75c. per 100 lb. terminal and 86c. intermediate, against 80c. and 92c. respectively; from Chicago, 70c. terminal and 75c. intermediate, vs. 80c. and 86c.; from Mississippi territory, 70c. and 75c., vs. 80c. and 86c.

The coastwise steamer rate on fir lumber from Oregon and Washington mills to San Francisco, which was recently as low as $3.25, or even $3 per thousand feet, has quickly jumped to $5, and is still advancing.

Framing the Trimmers for an Angle Fireplace

A piece of work which a carpenter in England was called upon to execute involved the framing of the trimmers for an open fireplace which was to occupy the corner in a sleeping room. He was somewhat in doubt as to how to cut the trimmers for this work, and in reply to the questions which he raised a brother chip suggested the method

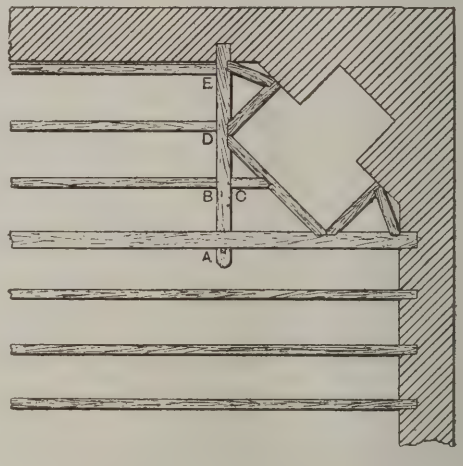


Fig. 1—Plan of Corner of Room.

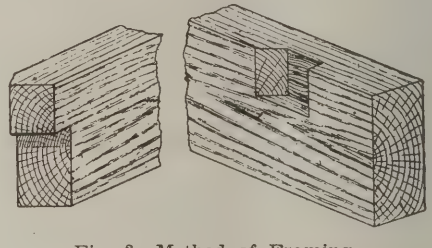


Fig. 2—Method of Framing

Framing the Trimmers for an Angle Fireplace

illustrated in the accompanying sketches. From Fig. 1, which represents a plan of the corner, it will be seen that the trimmer joist and the cross trimmer are framed square in the usual manner as indicated in Fig. 2. The joints at *A*, *B*, *C*, *D* and *E* are what is known as tusk tenon joints, and the one at *A* is keyed.

Ornamental cornices projecting over the sidewalk will be authorized by law if the Chicago City Council adopts an ordinance recommended by the committee on buildings. It provides a scale for cornice widths ranging from a 2 ft. projection from a building 12 ft. high to a cornice 5 ft. wide on the highest buildings. Hitherto all such cornices have been installed without any authority in law.

A Stucco House in Rochester, N. Y.

A Well Considered Interior with the Living Room and the Stair Hall Among the Noticeable Features

IN carrying out the ideas of his client who wanted a house in which there should be no bay windows, but "just a plain dwelling with no nooks or cozy corners; good to look at on the outside and easy to take care of on the inside," the architect evolved the design here illustrated. It is a stucco-coated dwelling of substantial construction and embodies the arrangement clearly outlined on the floor plans which appear upon the following page, these being reproduced direct from the architect's drawings and are presented to the scale customary in THE BUILDING AGE; that is, 1/16 in. to the foot. A striking feature is the living room extending entirely across the end of the house and from which opens the partially enclosed porch. The hall occupies the center of the building, and instead of the main stairs rising from the rear portion of it, as is often the case, the arrangement has been reversed and they start from a point adjacent to the entrance to the living room and rise toward the front of the house. There are two short flights with a landing half way up directly over the vestibule. A rather unusual feature in connection with the main entrance is that after passing through the vestibule the visitor ascends a flight of four steps to reach the level of the hall.

Just beyond the main hall, which is 10 ft. wide, is what might be termed a rear entry wherein are located the telephones and out of which opens a toilet, all as clearly indicated on the floor plan.



The Stucco Residence of Mr. Louis C. Rogers in Rochester, N. Y.—Architect, Horace T. Hatton

At the left of the hall are dining room and kitchen, communication between the two being established through a well equipped pantry measuring 6½ x 11 ft. in size. The pantry is lighted by a window, beside which is located the refrigerator so placed that it may be readily iced from a small platform outside. The kitchen sink is placed against the pantry partition with a slide in the latter opposite the drip board so that dishes may be readily passed from one room to the other.

Another one of those little conveniences which help to make the kitchen equipment complete and the quiet of the early dawn undisturbed is a milk locker in the wall between the kitchen and the rear porch. Here the milkman can place the daily supply of bottled milk, and his early delivery in no way tends to disturb the occupants of the house. Again it insures safe receipt of it by the family.

On the second floor are four sleeping rooms and a bath room, together with commodious clothes closets. The rear flight of stairs to this floor rises from a point near the door leading from the kitchen into the rear hall and the flight is continued to the attic, wherein are located the servants' quarters. The bath room is directly over the toilet on the first floor, so that the piping is concentrated. Conveniently located to the sleeping rooms and bath room is a linen closet, and just at the right of the bath room is a broom closet.

The foundations of the house are of concrete with stucco on wood lath above grade. The studs, floor joists, rafters, etc., are of the usual dimensions and in executing the work the lath were put on diagonally 4 in. apart over Neponset R.R.R. Fabric. On this, in reversed direction, were placed lath ¾ in apart.

The first mortar coat was the usual lime mortar, filling in solid to the sheathing boards. The finishing coat was of Portland cement mortar with the surface floated with burlap on the trowel to roughen the surface. The plaster was given two coats of Bay State Brick and Cement Coating of buff tint.

At the front entrance are cast granite steps and the base course was also cast. "Rookwood" tile in dark blue color were used in the decoration of piers and columns.

The floor of the porch is reinforced concrete with "Ruabon" Welsh quarry tile flooring.

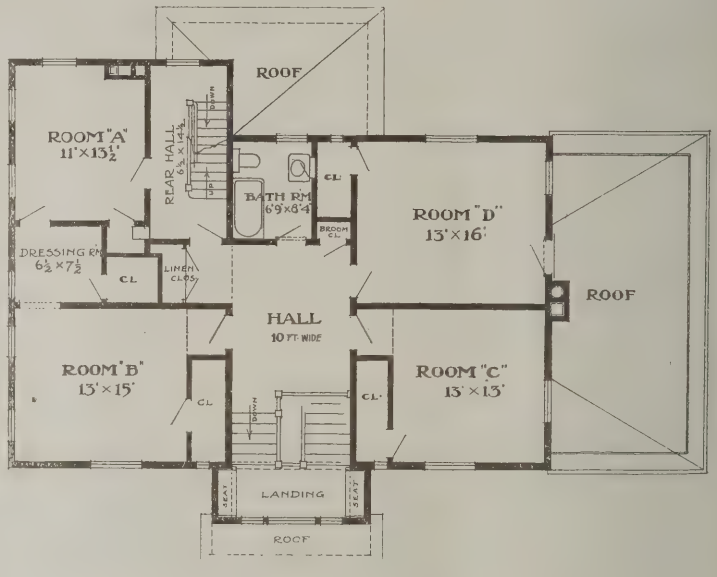
The roof is covered with Ludowici Spanish tile, which, in combination with the stucco exterior, gives a most pleasing effect.

The vestibule has tile floor with verde-antique marble base. The steps up to the main hall are of light Tennessee marble. The floor in the hall is of kiln run, light gray tile with a dark green border.

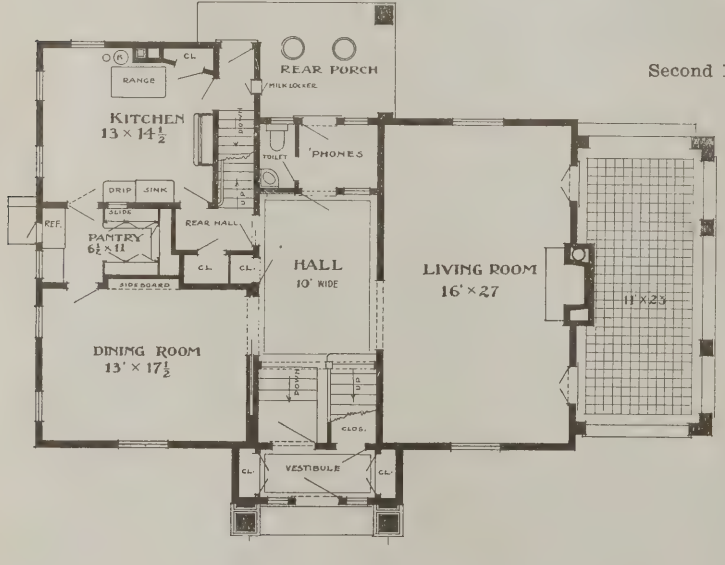
The stairs are white with mahogany treads, posts and rail. The living room and dining room are finished in mahogany. The hall and rooms on the second floor are finished in white enamel and the doors are mahogany.

A comfortable temperature is maintained within the building by the Brommel system of vapor heating.

Below the rear porch is a well and in the concrete floor is a removable walk-light, so that sucker rods may be removed from the well.



Second Floor Plan—Scale 1/16 In. to the Foot



First Floor Plan—Scale 1/16 In. to the Foot

A Stucco House in Rochester, N. Y.

The two-story cement-coated dwelling here shown is the residence of Mr. Louis C. Rogers, Highland Avenue, Rochester, N. Y., and was erected in accordance with plans prepared by Architect Horace T. Hatton, 507 Cutler Building, Rochester, N. Y.

Stairway and Elevator Inclosures

At the present time there are two types of metal lath and plaster partitions which are being used for inclosing stairways and elevators. One is the 2½ or 3-in. thick solid plaster and metal lath partitions and the other is the 4-in. thick hollow partition. Laboratory tests and observations of behavior in actual severe fires show that the solid partition provides ample protection. Some designers, however, prefer to have the added factor of safety that is secured through the air space of the hollow partition, says a recent issue of *Expanded Metal Construction.* The supports for the partitions consist of ¾ or 1-in. steel channels securely fastened at the floor and ceiling. The lath is wired to these channels and Portland cement plaster is applied to both sides of the lath on the solid partition in successive coats until the desired thickness is obtained. In the case of the hollow type the plaster is applied to only one side of the lath. The construction is such as to make a partition that is in every way satisfactory for the purpose.

Glass in Building Construction

A Variety of Purposes for Which This Material Is Rapidly Growing in Favor in Building Operations

USE of the steel frame in building construction has made all buildings, no matter what their actual height, only one story high. Crushing strength, heretofore required of all material entering into the work, has given way to requirements in lightness and durability. Before the advent of the steel skeleton, six-story (and not to exceed eight-story) buildings were the limit; walls started from the ground of sufficient thickness to support all stories on it, gradually decreasing with the height. Now all is different; foundation beneath the steel columns bears all loads, and the height of the building governs the thickness and tensile strength of the steel. The exposed materials without and within now are being selected with a view to durability, beauty and sanitary effects combined with lightness. The greater the increase of these qualities proportionately with the decrease of weight so is the value of the materials enhanced. In factory construction, and more recently in mercantile buildings, seven-eighths of the outside walls consist of glass. The steel window sash has made it possible to have nearly light-conveying walls on all exposed sides of business buildings.

New Formula for Opal Glass

Simultaneously with the advent of the steel structure releasing the crushing strength requirements of the materials comes the new formula of opal glass. White glass, as known twenty years ago called for a batch mixture costing 3½c. to 6c. a lb. in the melted glass ready to use. This initial cost made white glass for building purposes impossible. Now white glass mixture is found to be satisfactorily based on feldspar and fluorspar instead of lead, arsenic and cryolith, the basis of the earlier mixture. These chemicals are found scattered in all parts of the United States in abundant quantities and at a low price, so that opal glass is now produced at ¾c. per lb. in the melted glass. The cheap white formula opens the way for the use of glass in building materials. Henceforth this new element must be looked for in all places of building construction demanding the elements before stated.

Glass for Brick, Wainscoting, etc.

Glass brick, the impossible a generation ago, now becomes possible. Glass sheets for wainscoting, table tops, counter tops, kitchen table tops, refrigerator and the like, become possible in the discovery of this new formula. Purposes innumerable are springing up daily for the use of this glass. It can be seen at once that this new material means permanency.

The crushing strength of glass is three times that of granite, ten times that of concrete, six times that of the hardest brick, sandstone or limestone, and different from all in that it is absolutely non-absorbent. This latter quality makes it highly sanitary. There are dozens of buildings within a short distance of every city and town that hold in the decayed sash of the windows pieces of glass that have possibly outlasted one or two buildings before it, and if not crushed by a blow will outlast any number of structures of other materials. There is nothing in building construction that absolutely endures as does the glass. A tornado will tear off the chimney, twist the porch out of position, and probably carry off the roof, but the thin sheet of glass withstands every storm. It is plain to see why the building trades have flirted with this material since building construction became one of the principal arts of man.

Glass Brick a Standard Building Material

Within the past five years glass brick has come upon the market, has been tried out in almost every conceivable test to which building material is put, and has taken its place with other building materials as a standard commodity. The old adage, "Those who live in glass houses should not throw stones," must now be packed in ice with the story of "Darius Green and His Flying Machine," for the supposedly impossible has now actually become possible, and is rapidly coming into general use.

New Publications

Practical Gilding, Bronzing, Lacquering and Glass Embossing. By Frederick Scott-Mitchell. 184 pages. Size 5 by 7¼ in. Numerous illustrations. Bound in cloth. Published by the Trade Papers Publishing Company, Ltd., London, England. Price $1.25.

This little work deals in a practical way with the subjects indicated by the title and affords a good idea of English practice. The matter is comprised in fifteen chapters, beginning with tools and appliances and ending with a treatment of the subject of embossing on glass and glass chipping. There is an appendix dealing with lacquering metal work. The work is really a second edition of the book on the same subject published by the author in 1905, but many new illustrations have been added and the text thoroughly revised.

The magnificent national hospital at San Salvador is composed of pressed-steel plates inside and out, bolted to wrought-iron framework, and the roofing is of corrugated iron.

Brief Review of the Building Situation

Building Operations for January in 117 Cities Show an Increase of 26.6 Per Cent Over January, 1916

THE improvement in the building situation of the country noted in our last issue has continued with gratifying results, and reports for the first month of the new year covering 117 cities indicate an amount of new work planned which is 26.6 per cent in excess of that projected in January, 1915. The extensive additions which are being made to industrial plants in various parts of the country are reflected in some measure in the larger volume of operations in the Eastern, Middle and Southern States. In January the greatest gain was in the cities of what may be designated as the Middle States, while next in order are the cities in the Southern tier.

The figures in the accompanying table show the relative amount of work planned in the leading cities of the East:

CITIES OF THE EASTERN STATES

	January, 1916	January, 1915
Albany	$114,595	$340,290
Allentown	120,445	5,835
Altoona	4,982	22,255
Binghamton	75,700	39,219
Bayonne	125,683	38,000
Boston	4,756,229	2,408,000
Bridgeport	392,276	98,110
Brockton	50,950	48,275
Buffalo	510,000	381,000
East Orange	59,955	87,121
Elizabeth	455,088	82,314
Erie	116,171	66,509
Harrisburg	86,575	7,575
Hartford	235,978	139,265
Haverhill	25,200	15,400
Holyoke	68,400	23,850
Irvington	39,015	35,000
Jersey City	366,745	184,385
Lawrence	56,250	48,375
Manchester	50,684	19,317
Montclair	72,000	80,861
Newark	359,363	339,803
New Bedford	204,770	75,560
New Britain	53,650	35,095
New Haven	675,068	132,155
New York:		
Manhattan	4,588,950	8,164,716
Bronx	2,982,227	2,108,668
Brooklyn	3,012,343	1,624,203
Passaic	43,280	20,410
Paterson	141,788	73,895
Philadelphia	1,859,090	910,805
Pittsburgh	344,944	465,461
Portland	78,445	28,765
Quincy	79,875	59,605
Reading	11,750	5,900
Rochester	746,506	246,717
Scranton	129,475	38,170
Schenectady	57,950	327,650
Springfield	325,815	266,005
Syracuse	109,445	219,715
Trenton	132,520	36,812
Troy	207,995	100,014
Utica	77,135	109,905
Wilkes-Barre	33,850	34,643
Worcester	330,185	77,276
Woonsocket	19,975	19,500

In the thirty-six cities of the Middle States from which reports are presented, there are twenty-six showing increases and ten decreases with a resultant gain of 38 per cent over January, 1915. An immense amount of new work was planned in Chicago, the figures being almost double those for January, 1915. Other cities showing notable increases are Cleveland, Columbus, Dayton, Des Moines, Detroit, Duluth, Grand Rapids, Indianapolis, Kansas City and Milwaukee. More important among the cities showing decreases are St. Louis, St. Paul, Evansville and Saginaw.

CITIES OF THE MIDDLE STATES

	January, 1916	January, 1915
Akron	$288,430	$52,635
Cedar Rapids	48,000	44,000
Canton	71,725	31,175
Chicago	8,118,200	4,327,900
Cincinnati	445,895	451,350
Cleveland	1,600,895	1,116,080

CITIES OF THE MIDDLE STATES (Continued)

	January, 1916	January, 1915
Columbus	223,415	85,100
Davenport	27,579	26,455
Dayton	115,645	30,000
Des Moines	115,645	52,250
Detroit	1,979,410	1,217,290
Duluth	113,733	90,155
East St. Louis	5,885	23,025
Evansville	31,862	69,050
Fort Wayne	64,250	35,100
Grand Rapids	118,455	80,072
Indianapolis	392,902	266,907
Kansas City, Mo.	445,575	387,880
Kansas City, Kans.	23,530	35,690
Lincoln	53,045	70,135
Milwaukee	2,433,838	203,649
Minneapolis	586,340	485,100
Omaha	177,025	165,075
Peoria	131,500	24,100
Saginaw	4,675	133,794
St. Joseph	10,990	12,380
St. Louis	644,191	1,094,673
St. Paul	423,198	699,258
Sioux City	42,200	24,950
Springfield	92,525	69,400
Superior, Wis.	6,955	65,830
Terre Haute	22,535	2,400
Toledo	560,875	537,297
Topeka	29,110	18,270
Wichita, Kan.	34,400	32,300
Youngstown	96,345	69,367

Coming now to the tier of Southern States we find of the eighteen cities reporting that fourteen show increases and four decreases with a resultant gain of 35.33 per cent. The greatest activity as compared with a year ago was in Baltimore, Birmingham, Dallas, Memphis, Nashville, Oklahoma, Richmond and Wilmington.

CITIES OF THE SOUTHERN STATES

	January, 1916	January, 1915
Atlanta	$130,480	$273,796
Baltimore	767,712	575,072
Birmingham	273,611	72,178
Dallas, Tex.	771,630	140,005
Fort Worth	91,127	90,705
Huntington	41,555	18,455
Louisville	178,980	333,520
Memphis	186,800	101,953
Montgomery	57,399	40,483
Nashville	150,999	56,037
New Orleans	134,425	146,909
Norfolk, Va.	148,222	119,864
Oklahoma	103,350	18,300
Richmond	300,592	159,840
Savannah	52,000	152,750
Shreveport	54,449	46,326
Washington	738,546	470,328
Wilmington	263,768	58,084

In the extreme Western section of the country, taking those cities lying beyond Denver, six show increases and eleven decreases out of the seventeen reporting with a resultant gain of 6.6 per cent. This gain is largely accounted for in the operations in Los Angeles, Salt Lake City and Seattle. Heavy falling off in operations occurred in Portland, Sacramento, San Diego, San Francisco, Spokane and Tacoma.

CITIES OF THE EXTREME WESTERN STATES

	January, 1916	January, 1915
Berkeley, Cal	$64,500	$83,750
Colorado Springs	11,986	7,665
Denver	14,260	177,636
Little Rock	31,586	29,559
Los Angeles	1,678,724	860,360
Oakland	248,408	291,859
Portland	169,375	378,040
Pueblo	21,636	6,300
Sacramento	73,407	115,735
San Diego	128,554	288,895
Salt Lake City	178,262	85,650
San Francisco	947,551	1,006,043
San Jose	20,067	24,156
Seattle	413,505	408,585
Spokane	38,555	92,185
Stockton	18,222	24,040
Tacoma	33,154	59,598

Current News of Builders' Exchanges

Annual Meetings and New Officers for the Ensuing Year—Removal of Cleveland Exchange

Banquet of Quad City Builders' Exchange

AN EVENT which will long be pleasantly remembered by those present was the first annual banquet of the Quad City Builders' Exchange, held in Rock Island, Ill. There were in attendance 287 builders and their friends from the cities of Davenport, Rock Island, Moline and East Moline, which cities are represented in the organization. The toastmaster was Irving C. Norwood, secretary of the Davenport Commercial Club, and following a brief talk on "Co-operation and Organization," introduced as the principal speaker of the evening H. L. Lewman, president of the National Association of Builders' Exchanges. He took for his subject "Building Organization and Its Needs," and also dwelt at some length upon the Standard Contract Documents. The address of Mr. Lewman was closely followed and his remarks aroused a great deal of interest on the part of his hearers.

The Exchange is composed of representatives of practically all trades connected with the building industry, including general contractors, mason contractors, painters, plaster contractors, plumbers, heating contractors, tin and sheet metal workers, electricians, excavating and grading contractors, material men and dealers as associate members. The object is to make all members in the building industry in the four cities named one large family and to assist one another in their respective branches of the industry. The officers of the Exchange are as follows:

President.....A. A. Arnould, Davenport
First Vice-Pres....Edward Kunkel, Davenport
Second Vice-Pres..Archie McInnis, Rock Island
Third Vice-Pres.....Axel Carlsen, Moline
Fourth Vice-Pres..G. F. Schilling, East Moline
Secretary.....Otto Bargmann, Davenport
Treasurer.....F. R. Dwend, Moline

Great interest is being manifested in the securing of additional members and we understand that from twenty-five to thirty applications are acted upon at every meeting. While the Exchange is only four months old there are at present about 200 members and the number is rapidly growing.

Annual Election of Milwaukee Exchange

What was regarded as the banner election in the history of the Builders' and Traders' Exchange of Milwaukee, Wis., occurred in January at the headquarters, 456 Broadway, when officers were chosen for the ensuing year. There were over 400 members present and everyone appeared to have a good time. The balloting resulted as follows:

President.....Burton L. Hibbard
First Vice-President.....Arthur J. Maag
Second Vice-President.....Louis Hoffman
Secretary.....Frank Spetz
Treasurer.....Anton Hennecke
Assistant Secretary.....A. E. Stein

The building outlook is regarded as most encouraging in the city and vicinity and contractors are expected to find plenty to do as soon as the season opens.

The annual meeting of the Builders' Club was held at the same time, when the following officers were chosen:

President.....William Gregory
First Vice-President.....Thomas E. Dever
Second Vice-President.....William Metzker
Secretary.....Arthur J. Maag
Treasurer.....Anton Hennecke

New Officers of Philadelphia Exchange

At the recent meeting of the Master Builders' Exchange of Philadelphia the following officials were chosen for the ensuing year:

President.....George J. Watson
First Vice-President.....J. L. Tyson
Second Vice-President.....O. W. Ketcham
Third Vice-President.....E. E. Hollenback
Treasurer.....Frank H. Reeves
Secretary.....Charles E. Smith

It is interesting to state in this connection that President Watson was re-elected by a unanimous vote, and since he has been at the head of the organization it has made remarkable progress. Every department has taken on new life, and builders are strong in their praise of the official management, for it is claimed Philadelphia will receive the benefit by reason of more modern and safer buildings, and every safeguard that can be thrown around construction work by those engaged in the building industry. The outlook for 1916 is said to be the most promising in the history of the Exchange.

Annual Meeting of Nashville Exchange

The annual meeting of The Builders' Exchange of Nashville, Tenn., was held in their quarters on the third floor of the Noel Block in January, when officers were elected for the ensuing year, as follows:

President.....J. A. Daugherty
First Vice-President.....J. W. Patrick
Second Vice-President.....J. H. Peter
Secretary-Treasurer.....Lee Parrish

Reports were presented covering the work of the Exchange during the past year, and in the evening the annual banquet took place at the Commercial Club. From the standard of attendance and enthusiasm the affair was regarded as the most successful in the history of the organization. President Daugherty was toastmaster and he arranged a number of surprises which added greatly to the enjoyment of the occasion. The program was a unique one in that there were speakers to represent all the branches of building, the architect having first place on the program and the builders' hardwareman the last. Secretary Parrish had some very interesting remarks to present on the subject, "If I Were a Builder."

New Officers of Reading Exchange

At the recent annual meeting of the Master Builders' and Contractors' Exchange, Reading, Pa., held in the rooms of the Chamber of Commerce, officers for the ensuing year were elected as follows:

President.....D. Elmer Dampman
Vice-President.....David E. Gring
Treasurer.....Daniel H. Hunter
Secretary.....Howard C. Faust

The secretary reported that most of the contractors and builders in Reading are associated with the Exchange and plans are being made to bring in all those now outside the organization.

Alameda County Builders' Exchange

The annual meeting of the Builders' Exchange of Alameda County, Cal., was held in January, the principal business accomplished being the election of direc-

tors, as follows: Frank Oates, Al. Hillman, J. P. Woods, A. Poulsen, James Pedgrift, P. N. Winlund, William Makin, O. W. Fletter, H. C. Steinbach, E. G. Hunt and O. A. Edwall. It was also decided to hold a membership meeting the first Monday of each month.

Following the business meeting at Exchange headquarters, the members went to Hotel Oakland for their annual banquet. William Makin, president of the Exchange, acted as toastmaster, and a number of speeches were made by prominent members; but the formal talks were brief, and much of the time was taken by entertainment stunts, in which a number of the members participated. The banquet committee consisted of O. W. Fletter, E. G. Hunt and Al. Poulsen.

New Officers of Hamilton Builders' Exchange

At the annual meeting of the Builders' Exchange of Hamilton, Ont., Canada, held in December, the following officers were selected for 1916:

President .....C. T. Pearce
First Vice-President .....E. Kent
Second Vice-President .....William Penny
Treasurer .....James McNeil

Following the election an interesting address on the Workmen's Compensation Act was given by Secretary J. Flower of the Provincial Builders' Exchange, who set forth very clearly the additions and amendments which have been made since the passing of the act and gave details of more amendments likely to be made in the not very distant future. A banquet was served just prior to adjournment.

Increasing Membership of Jacksonville Exchange

The Builders' and Traders' Exchange at Jacksonville, Fla., has been increasing the membership through a campaign recently inaugurated and renewed efforts are in progress to bring results along this line. A recent canvass by six teams of the Exchange resulted in adding fifty new members, and on the first of the year three additional teams were selected in the hope of increasing the number by fifty more.

An interesting feature of the work being done by the Exchange is the publication of a "Bulletin" each day. All the newspapers of the towns of Florida are taken by the Exchange and these are looked over every morning and the news of the principal work being done at various places is briefly summarized and the information presented in the "Bulletin" in question.

New Officers of Sacramento Exchange

The result of the election of officers at the meeting of the new Builders' Exchange at Sacramento, Cal., on Jan. 11 resulted in the following choice:

President.....F. E. Connors
Vice-President.....W. C. Keating
Secretary.....W. B. Scollen
Treasurer.....W. J. Brughman

At the meeting some interesting talks were made by those prominently identified with the trade, among the number being J. E. Brandon, a supervisor and building contractor of San Francisco, and W. H. George, a dealer in builders' materials in the same city. They told the members of the activities and results accomplished by the Builders' Exchange in San Francisco.

Cleveland Builders' Exchange to Move

The Builders' Exchange of Cleveland, Ohio, will move April 1 from its present quarters in the Cleveland Chamber of Commerce Building, which it has occupied for a number of years, to new quarters in the Rose Building at East Ninth Street and Prospect Avenue. This change is to be made in order to secure more room, the new quarters having more than double the floor space of the present ones. The Exchange will occupy about 15,000 sq. ft. of floor space, or about three-fourths of the entire third floor of the Rose Building, which has been leased for five years with an option for longer periods. Two large bronze tablets will be placed on either side of the main entrance of the building bearing the words, "Builders' Exchange, Third Floor."

In connection with the new quarters the Cleveland Exchange plans the establishment of a Permanent Building Exhibit which will be one of the largest in the United States. In addition to the exhibit space will be provided for the division of floor space into private offices for members, open desk spaces, assembly rooms and other improved facilities for the members of the Exchange.

Annual Banquet of Youngstown Exchange

The members of the Builders' Exchange of Youngstown, Ohio, held their annual banquet on Tuesday evening, Feb. 8, in the banquet hall of the Y. M. C. A. The plans for the evening were in the hands of an entertainment committee consisting of W. G. Heacock, chairman; P. A. Andrews, S. A. Dalzell, D. G. Morris, T. Murray, Jr., and Gordan Phillips. There were several special entertainment features, but the event of the evening was the talk on "Importance of Organization" by H. L. Lewman of Louisville, Ky., president of the National Association of Builders' Exchanges.

New Officers of Rochester Exchange

At the annual meeting of the Builders' and Traders' Exchange of Rochester, N. Y., held Feb. 1, the following officers were elected for the ensuing year:

President .....F. H. Phelps
First Vice-President .....Clarence Wheeler
Second Vice-President .....J. E. Summerhays
Treasurer .....Henry Lampert
Secretary .....A. J. Mahon

There were five directors elected to serve for a period of three years.

Banquet of Omaha Exchange

The members of the Builders' Exchange of Omaha, Neb., held their annual banquet at the rooms of the Commercial Club on the evening of Feb. 1. The toastmaster of the evening was Charles E. Black, and among the speakers were Richard L. Metcalfe, who had for his subject "Building," and John Latenser, Jr., who gave an interesting talk on "The Architect and the Contractor." The feature of the entertainment program was a little sketch called "The Workhouse Ward."

Columbus Exchange Helps Newark Exchange

As a result of the recent visit to Newark, Ohio, of President R. L. Watson of the Builders' Exchange of Columbus and B. M. Freeman, Ohio Commissioner of the National Association of Builders' Exchanges, thirty-five new members were added to the Builders' Exchange of Newark. The success of this missionary trip was reported at the "Old Timers'" meeting of the Columbus Builders' Exchange held on the evening of Feb. 2. The affair was largely attended and great interest was shown in the progress of the Columbus organization. At the noonday luncheon K. G. Thompson urged the co-operation of the Columbus Builders' Exchange in the movement for a city-planning commission.

One of the largest and most valuable timber trees of the country is the tulip tree, known to lumbermen as "yellow poplar." It is the only tree of its kind in the world.

Some of the architects of San Francisco are in favor of saving the Marina as the vital part of a grand water front park to keep green the memory of the Panama-Pacific Exposition.



For Roof *Beauty* and *Economy*—

Asphalt Shingles

YOU rarely find so much *beauty* and *efficiency* combined in a building material as in *Asphalt Shingles.* Especially at a *moderate cost.*

Asphalt Shingles give a distinctive touch to the outside appearance of any house on which you use them. They add $1000.00 to the looks at no extra expense. Their rich coloring stands out in pleasing contrast to the other building material used.

Cold weather cannot harm them—they do not crack or split, and as water cannot penetrate them, they never freeze. With all these advantages to the houseowner, they can be laid so much faster than common roofs that you *save labor charges*—which puts you in a strong position to get more business.

Big, National Advertising To Help You

We are starting the building season with big advertising space in Magazines and Farm Papers, featuring *Asphalt Shingles.* This helps you to help yourself and help your *customers.* It aids you in showing them better roofing value for their money. It assists you to use this efficient, economical, handsome roofing, and secure more business.

Our free booklet, *"The Roof Distinctive"* should be in the hands of every Contractor and Builder. Send for your free copy.

In all of our advertising we always refer the house owner to his Architect and Contractor about Asphalt Shingles.

Asphalt Shingles — Destined to Roof the Nation's Homes

The mark to always look for on packages of good Asphalt Shingles.

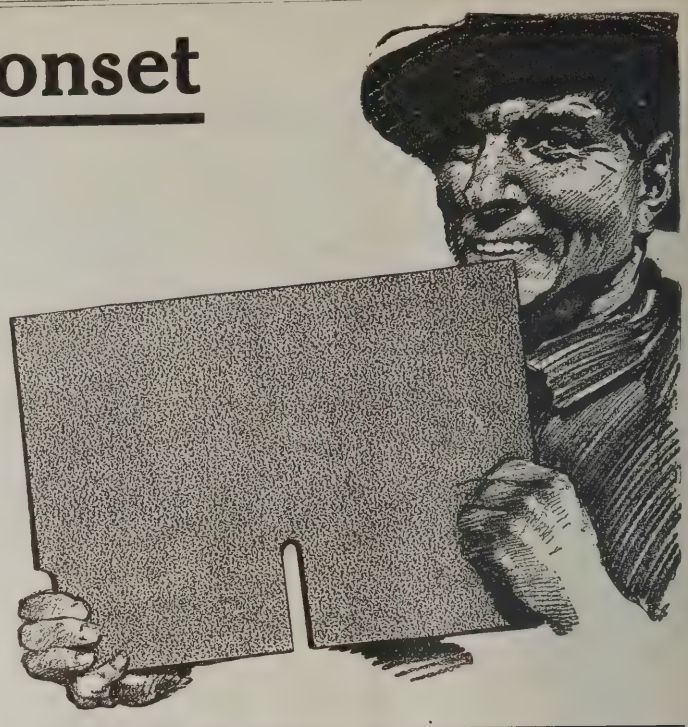
Asphalt Shingle Publicity Bureau

854 Marquette Building ∴ ∴ CHICAGO



The mark to always look for on packages of good Asphalt Shingles.

"I Am the Neponset Man"



"They called me that at first to jolly me.

"They didn't believe I had shingles that couldn't crack, rot, rust or rattle loose.

"But now the name Neponset is my capital. The first job where I used

NEPONSET Shingles

broke the ice for me. That one job led to a second, and the two soon became four. And so my business grew.

"Every one of these red and gray roofs here in town is mine. And many of the others, too, for I got a reputation as a roofer on account of my success with Neponset Shingles."

The same materials are used in Neponset Shingles as in the well-known Paroid Roofing, also used in Neponset Proslate, the highest grade colored ready roofing ever made. Neponset Wall Board, Neponset Waterproof Building Paper and Neponset Floor Covering are other well-known Neponset products.

Why Not Make Every Room Habitable?

Almost every home builder economizes somewhere. Often a room is left unfinished. In such a case you can give that extra bit of service that is so well appreciated.

Recommend that it be finished with

NEPONSET WALL BOARD

There are three finishes to choose from—all are waterproofed and prevent warping.

If you do not know Neponset Wall Board you cannot know the possibilities that lie in this substitute for lath and plaster. Let us send you a sample. Details are given in "Repairing & Building" but you should examine the board itself.

Mail your request today.

We want a carpenter in your Town to be known as the "Neponset Man." Will you be the one? Send Coupon to-day for particulars.

COUPON

BIRD & SON, Dept. B, East Walpole, Mass.

Please send me information and samples of the Neponset Shingle and Neponset Wall Board. Also a copy of your book, "Repairing & Building." This request, I understand, does not put me under any obligation whatsoever.

Name.....

Address.....

COUPON

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

The Neville Adjustable Scaffold

ONE of the latest candidates to popular favor in the way of an adjustable scaffold for the use of masons in building chimneys is that illustrated in Fig. 1 and made by the Neville Mfg. Company, 210 North Freemont Street, Kewanee, Ill. The device consists of two pairs of brackets—one on each side of the proposed chimney. The brackets are placed

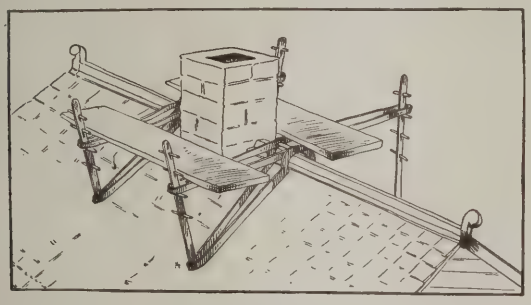


FIG. 1.—The Neville Adjustable Scaffold as It Appears Ready for Use About a Chimney

in position by hanging them over the ridge of the roof upon which they rest firmly, fitting equally well over a ridge board or metal ridge roll. The arrangement of parts is such that there is no weight on the roll itself. When in position the brackets are 6 ft. across, thus permitting of the support of a board of somewhat greater length. The brackets are made of soft steel, thus rendering it strong and durable, and the point is made that they can be used on shingle, metal, composition or slate roofs without damage to the roof. When not in use each bracket folds up compactly, occupying but little space, and is of convenient form for handling. To the workman there is a very perceptible saving of time and material both in the putting up and in the taking down of this scaffold, while to the house owner there is the saving of damage to the roof.

Finishing Southern Yellow Pine

Many of our readers will be interested in a handsome *brochure* containing specific directions for finishing Southern yellow pine, which has just been sent out bearing the above title by the Southern Pine Association, New Orleans, La. It is a work of twenty pages, profusely illustrated with well executed halftone engravings, of interiors for the most part, of buildings in connection with which Southern yellow pine has been used. A striking feature of the publication is a folded sheet carrying seven colored illustrations of Southern yellow pine interior finish. The examples measure 1¾ in. in width by 6½ in. in height, thus affording an area sufficient to demonstrate in a striking manner the appearance of the wood in question when finished in the various styles shown. We understand that the directions given within the covers of the work are based on the "uniformly successful experience of the foremost American painters and structural experts. The rules given vary but little from those governing good workmanship in finishing others of the leading building woods. In their intelligent observance it will be found that Southern yellow pine not only takes and holds paint perfectly and permanently, but that no effect of richness and beauty in color and tone is beyond the possibilities of the builder with this wood, and at a cost much less than that entailed in the employment of any other variety of anything like the same intrinsic merit."

Another feature of the work which will appeal to a great many readers is found in the directions for finishing Southern yellow pine floors. Emphasis is laid upon the necessity of care in the preliminary work and to the fact that a hard wood floor at small cost is within the reach of every house owner no matter how modest may be his domicile. Reference is also made to the use of Southern yellow pine for finish and trim in kitchens, this being due, it is claimed, not altogether to the moderate cost of that wood but to the dense even texture of the wood which becomes harder and more dense with age, thus making it particularly desirable for use where "the hot vapors of cooking might penetrate and render unsanitary more porous woods." It is further pointed out that the material takes enamel so readily and holds it so tenaciously that it is well adapted to use in kitchens so finished. The little work is one which cannot fail to prove helpful to every one interested in the interior finish of houses.

Flexible Concrete Forms

Those of our readers having to do with concrete work cannot fail to be interested in a "form" which is used for building any hollow or solid wall concrete building at a cost claimed to be much less than the ordinary expense of construction where temporary "forms" of any kind are used. The claim is made that dwelling houses, garages, factories, ice houses, etc., can be constructed through the use of this "form" at a material saving over brick, tile, cement-block or wood construction. It is referred to as simple in construction and most rapid in operation. One operator it is said can build as rapidly as three men can mix and carry concrete to the "form." There is no delay in waiting for the concrete to

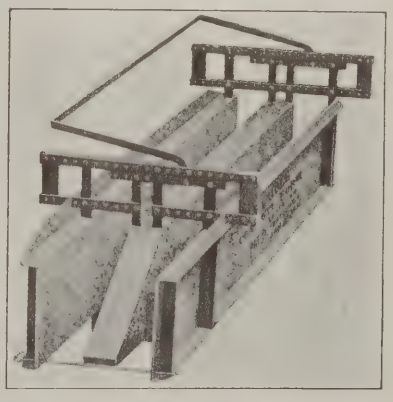


FIG. 2.—View of One of the "2-E Flexible Concrete Forms"

set, as it is only necessary to spread and tamp the fresh concrete in the machine until full, then raise the lever releasing the machine from the wall, move it forward, reclamp at the wall and repeat the operation. The device is known as the "2-E Flexible Concrete Form," and is made of metal. The supporting frames are of a very rigid truss design and the arms supporting the mold boards are made of flexible spring steel and will not bend out of shape. The mold boards are of heavy gal-

vanized sheet metal and will neither bulge, warp nor get out of shape when exposed to the weather. All parts are interchangeable. A general view of the device is presented in Fig. 2, and it is made by the 2-E Flexible Concrete Forms, Eagle, Wis.

Lightning Hollow Chisel Mortiser and Relisher

A machine just placed upon the market which cannot fail to prove interesting to those having occasion to mortise sash stiles, rails and muntins as well as relishing out the tenon and cutting away that part of it

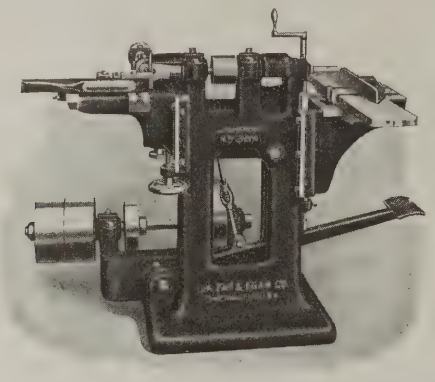


FIG. 3.—Lightning Hollow Chisel Mortiser and Relisher

that is under the mold, is the No. 384 Lightning hollow chisel mortiser and relisher, illustrated in Fig. 3, and made by the J. A. Fay & Egan Company, 221-241 West Front Street, Cincinnati, Ohio. The capacity of the machine is such as to be able to work material up to 6 x 6 in. and 3 in. deep, or by reversing through 6 in. It will carry chisels up to ¾ in. square, and any larger or irregular shaped mortise can be quickly and easily made by overlapping cuts. It has a traveling relishing table, the relishing head being carried on the same spindle with the bit for the hollow auger. At right angles to the relishing head is a borer that cuts away that portion of the tenon which is under the mold. The machine is self-contained, occupies but small floor space, requires very little power and does clean-cut and accurate work. The claim is made that it is so simple to adjust and easy to operate that a boy can run it. Those who have heretofore operated separate machines for the various kinds of work indicated cannot fail to appreciate the advantages of the combination machine here illustrated and described.

Minneapolis Branch of Cornell Wood Products Company

Those of our readers among the architects, builders and contractors doing business in the Northwest will be interested in learning that the Cornell Wood Products Company of Cornell, Wis., and Chicago, Ill., has opened offices in the National Soo Line Building, Minneapolis, Minn., in order to meet the growing demands in that section for its output. The office is in charge of W. N. Spires, who is the assistant sales manager in charge of the Northwest district, and is said to be one of the best known experts on wall board material. Mr. Spires will be assisted by a staff of men located in Minneapolis, and in addition to this the company has arranged, at considerable expense, a demonstration and showroom in connection with the Minneapolis office. This will be found of great importance to architects and builders of the Northwest, who will thus have the opportunity of becoming thoroughly familiar with the company's system and method of doing business.

A New Field for Building Contractors

Just because a man operates a coal yard does not mean that his office should be grimy and unattractive; in fact, an orderly, well kept, cleanly office has a certain sub-conscious influence on the casual visitor or finicky customer; it suggests that the customer will get similar business-like attention and courtesy in his dealings with that concern. An interesting incident along this line occurred when a certain carpenter-contractor was making some repairs in the flooring of an Indiana coal dealer's office. The contractor suggested that for just a little additional outlay he could make over the entire office in a most attractive way.

"Don't want to spend the money—lumber is too high. Besides, people are going to buy coal just the same no matter what kind of an office I have," growled the coal dealer.

After the contractor had pointed out how he would use wall board, how little it would cost and how he could get the effect of a handsomely paneled quartered oak wall and ceiling by using grained wood Utility Board, the coal dealer grudgingly gave his consent. The result was really surprising. The fact that that coal dealer's business has increased considerably, that people are now glad to call on him at his office and that his own efficiency has improved 50 per cent may not be due entirely to the Utility Board with which his walls are paneled—but it certainly is due to the fact that his office is a better place in which to transact business.

In every locality there are similar places—offices where a little up-to-date renovating will do a world of good. Any interested contractor who wants to find out how to get this class of business need only write to the Heppes Company, 4501 Fillmore Street, Chicago, Ill., who will send full details and liberal samples of their new grained wood Utility Board.

The Louden Special Garage Door Hanger

A form of garage door hanger which is meeting with great favor at the hands of builders and garage owners, especially those living in the suburban and rural sections of the country, is that which has been brought out by the Louden Machinery Company, 5401 Court Street, Fairfield, Iowa, and the general appearance of which, upon a garage door, is clearly indicated in Fig. 4 of the engravings. The picture represents the inside



FIG. 4.—The Louden Special Garage Door Hanger in Use

of the door with the swinging section open, showing the ready entrance to the garage without the necessity of opening the entire door as would ordinarily be the case. The construction is such that when the complete door is thrown open it lays flat against the inside wall of the building, and the owner's car may be driven in

(*Continued on page 74*)

Fiberlic For Walls and Ceilings



Specify Fiberlic from Basement to Garret

FROM basement to garret—in any kind of building—there isn't a single room for which you can't safely specify Fiberlic Wall Board. For instance, take the Fiberlic surfaced kitchen illustrated above.

A kitchen surfacing, to be worth its price, should be absolutely *vermin-proof, odorless* and *fire-resisting*. These three essentials stand out boldly in Fiberlic—the superior wall board. For that reason builders who spend their clients' money judiciously specify Fiberlic.

But Fiberlic possesses other marked advantages. It is a sound-deadener and has great strength and lasting qualities. It is more economical than lath and plaster and thoroughly sized *throughout*.

All these superiorities are due to the exclusive patented Fiberlic chemical process that treats every fiber in the board.

Send for a sample of Fiberlic and try this test: Take your sample and pull it apart. Then do the same with the ordinary wall boards. Compare them and you'll immediately detect the absence of odor in Fiberlic.

We manufacture special Fiberlic paints and stains that come in 24 different colors and shades. Ask about them.

THE FIBERLIC COMPANY, CAMDEN, N. J.

LONDON (England) BRANCH: MacAndrews & Forbes, Ltd., Finsbury Court, E. C.



"Viceroy" One-Piece Bath (Patent applied for) KOHLER Plate No. V-12-A

This trade-mark—KOHLER—is on every piece of KOHLER enameled plumbing ware. It is incorporated in faint blue in the enamel at point indicated on illustration.

Enameled Plumbing Ware that is notable for its beauty and excellence

One of the characteristics of KOHLER Plumbing Ware is the beautiful whiteness of the enamel.

Its attractiveness compels attention and is an added value to the purchaser.

KOHLER enameling is in keeping with the excellent construction and uniformly high quality of our products.

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designs are modern and hygienic

Our designs represent twentieth century ideas in bathtubs, lavatories and sinks. The *one-piece* construction and KOHLER enamel make cleaning easy.

The KOHLER trade-mark is our guarantee of excellence.

Builders throughout the country select KOHLER Enameled Plumbing Ware because it is always of one quality — the highest.

Write for our "Viceroy" Book, describing the "Viceroy" *one-piece* built-in tub. The "Viceroy," low-priced, due to manufacturing economies, is the most popular built-in bathtub made.

MAKERS OF Trade-marked, Enameled Bathtubs, Lavatories and Sinks

"Its in the Kohler Enamel"

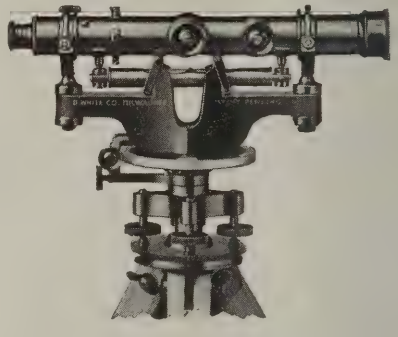
KOHLER CO. Founded 1873 Kohler, Wis., U.S.A.

BRANCHES Boston New York Pittsburgh Chicago San Francisco London

within 6 in. of the wall if necessary. As a consequence the owner can build his garage so narrow that he will just have room to enter the car through the open end and still there will be room for the door to open and close. All the fittings are included in what is known as the "Original Package," and the only materials necessary in doing the work are the lumber, a saw, a hammer and a screwdriver. This hanger is such that all danger of swinging doors is avoided, and its use does not cut off and waste several feet of space in the end of the garage as does the one or two-piece inside sliding door. The hardware or fittings are furnished complete for 6-ft., 8-ft., 10-ft and 12-ft. doors according to requirements. The claim is made that the roller-bearing swivel trolleys glide along on the tracks so easily that a child can open the largest door.

New and Improved Tilting Level

There has recently been placed upon the market a new and improved tilting level which will be found of special interest to architects, contractors and builders by reason of the various features which are embodied



New and Improved Tilting Level—Fig. 5—Instrument As It Appears When Used as a Level

in its construction. Fig. 1 shows the instrument as it appears when used as a level, while Fig. 2 shows it when used as a transit. Among the chief advantages of the instrument are the drop-center construction of the cross bar with standards cast in one solid piece which obviates the necessity of attaching and detaching the standards each time it is desired to use the

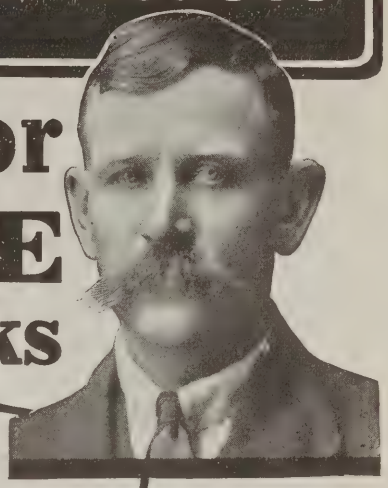


FIG. 6—The Instrument When Used as a Transit

instrument as a transit. The arrangement of parts is such that it is claimed the level can be converted into a transit in ten seconds. The standards are so constructed as not to interfere in the least when the instrument is used as an ordinary level. The standards, which are cast solid on the cross bar, are made of a steel-like bronze, and are ground true, thus requiring

(*Continued on page 76*)

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We saw them; you nail them. Shipped to you **bundled, tagged** and **numbered.** Numbers correspond to plans. Put up **quickly** and **easily.** Erection costs cut to finest point. Safe, **prompt** delivery on either method guaranteed no matter where you live. Freight paid **both** ways if you are not satisfied. Send coupon **now** for 2 big books of **300 plans,** photos, color schemes, **exact prices!** Houses $300 up. Also write for our **free** 156 page catalog of

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November 1st, 1915
Gordon-Van Tine Company,
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Gentlemen:—

When I placed my first order with you people in January, I felt that I was making more or less of a gamble. You will remember that my first order was a carload of shingles and I will confess that I was worried for a while about delivery and grades. I sold the entire carload in a week and a half and made a fine profit. You can well imagine how anxious I was to see the shingles. The car came promptly and when we opened it we were all delighted—they were the best Red Cedar shingles any of us had ever seen.

Since that time, I have bought three more carloads of shingles and about **17 cars** of your dimension lumber and **several thousand dollars of millwork from you,** and they were all just as satisfactory as were the shingles.

This last season has been the most profitable one I have ever had and it would be ungrateful for me to deny the important part your firm played in making it so. This town has never seen the equal of your dimension lumber, and with your doors, trim and interior finish, I was able to turn out really classy jobs. Considering your grades and service it is conservative for me to say that I have saved $900.00 this season by patronizing you.

Very truly yours,
(Signed)
EMIL PALMER

Read this Contractor's Letter

The saving of $900 that Mr. Palmer made, **you,** too, can make.

He **added $900 to his profits** in a **single** season. So can **you.**

Read his letter. Then **act** on the suggestion it contains. Buy **wholesale** from Gordon-Van Tine!

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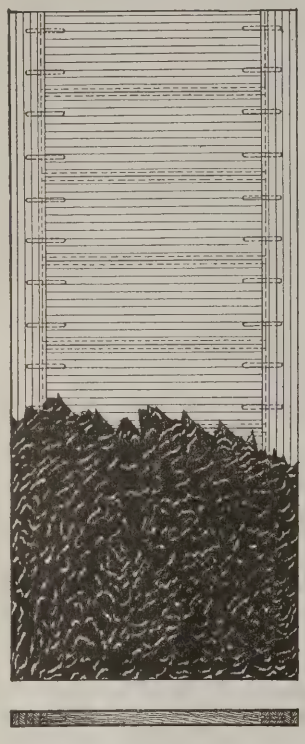
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Unequalled for entrances to bungalows, hospitals, schools, hotels, offices, etc. They are very attractive, never warp and are fire and sound retarding.

Furnished in many designs in any veneer and glazed with any design or kind of glass.

Read specifications and send for Catalogue.

SPECIFICATIONS:

Form cores of Veneered Doors having plain surfaces with narrow strips of sound Chestnut or White Pine, glued, cross-framed and doweled together, with edge strips of same wood as face veneers. Keep cores at proper temperature until glue is set and all surplus moisture evaporated.

Dress Cores to required thickness, with uniform and true surface, and cover both faces with ⅛-inch edge-glued veneers, applied under hydraulic pressure; when thoroughly dry and seasoned, sand and polish to required thickness.

Doors having openings for glass to be framed up and veneered as above specified, with glass moulds mitered around openings.

Specify and insist upon a construction as outlined and you will secure best results.

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Keep Your Men Busy This Winter at a Big Profit to You



THERE IS A BIG PROFIT TO YOU IN SELLING AND LAYING "SANTILITE COMPOSITION FLOORING" IN THE DULL WINTER MONTHS.

As you know, "SANTILITE COMPOSITION FLOORING" is laid just like plaster ⅝ of an inch thick on any sub-floor of wood or cement—sets in 6 to 8 hours into a smooth, jointless absolutely sanitary surface without cracks to collect dirt, germs and filth—absolutely no trouble to keep clean—never grows dusty regardless of wear—extremely easy to stand and walk upon—fire will not burn it—water will not soak it—of permanent pleasing appearance—never requires painting and will last the life of the building.

"SANTILITE" is the ideal floor in the home for the kitchen, pantry, bath or any room where a sanitary, dustless floor is wanted. It is extensively used in the factory for offices, halls, lockers, toilets in the store, restaurant, cafe, public or semi-public building in areas subjected to heavy wear where a pleasing appearance, durability and absolute sanitation are required.

There are many masons, building and cement contractors who are making big profits in selling and laying "SANTILITE." It enlarges that branch of your business where there is an ever-increasing demand—every home with a wooden bathroom or kitchen floor needs it—every public place that has lots of wear must have it. You will find that there is little competition in your own locality and it is especially attractive, for it keeps your men profitably busy during the closed or Winter Season.

Write for samples, illustrated instructions for laying "SANTILITE" and our proposition to make your winter's work profitable.

SANITARY COMPOSITION FLOOR CO.

134 Plum Street, Syracuse, N. Y.

no further adjustments. Another point emphasized in connection with this instrument is that the standards are permanently fixed on the bar ready for use any time on ten seconds' notice. This prevents all possibility of the standards being either in the instrument case in the office, or misplaced somewhere so that the busy contractor cannot lay his hands on them when urgently needed. This new and improved tilting level is made by the David White Company, Inc., 421 East Water Street, Milwaukee, Wis., and a catalog which describes the level in detail besides giving illustrations, descriptions and prices of a great variety of up-to-date instruments for up-to-date contractors can be secured free of charge upon application to the company.

A New Single-Drum Builders' Hoist

A type of single-drum hoisting outfit of special interest to building-contractors throughout the country has recently been placed upon the market by the Novo Engine Company, Lansing, Mich., and in Fig. 7 we present a general view of one of the hoists. A special feature of this hoist is that the single-drum outfit can readily be converted into a double-drum hoist simply by adding the forward drum and a few extra parts. This is a decided advantage to the contractor who has use for a single-drum hoist, but at some future time may find it necessary to use a double-drum affair. He can purchase the extra drum at any time and can

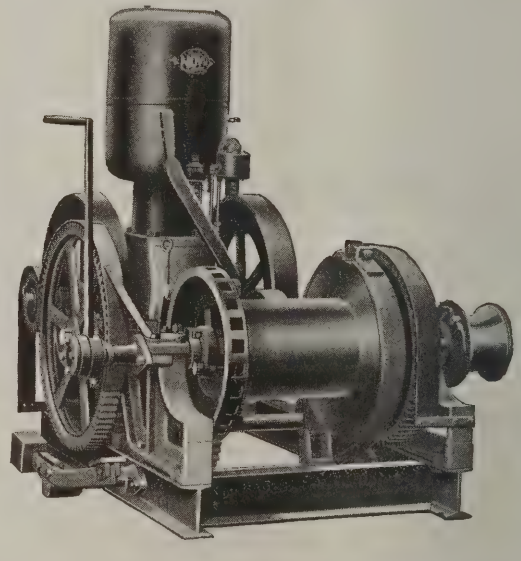


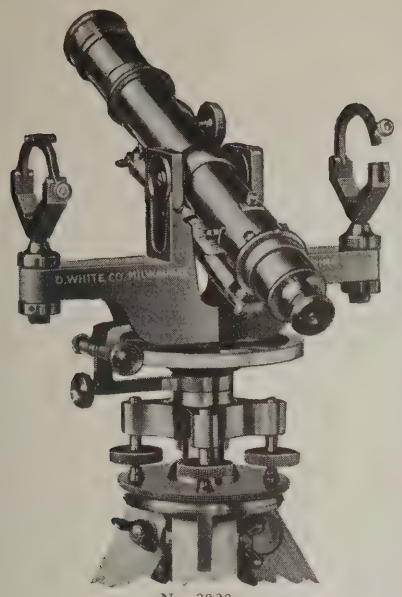
Fig. 7—General View of the Novo Single Drum Builder's Hoist

readily attach it to his single-drum hoist. Still another feature is the use of Thermoid lining in connection with the brakes, which are 3 in. wide and have a maximum angle of contact. The outfits can be furnished for various speeds; also reversible and non-reversible. The base is made of heavy steel shapes with strong angle connections securely riveted together. The gears have 3-in. face and are machine-cut from solid blanks. The drum frictions are of the double cone or V-type, made of segments of hard wood turned to fit the friction groove in the drum. The drums are of 12-in. diameter, 16-in. length, and have diameter flanges 20 in., holding 1050 ft. of half-inch cable.

Something About Zinolin Zinc Paint

Among the very interesting literature which is being distributed among architects and builders by the Keystone Varnish Company, 2010 Kestona Building, Brooklyn, N. Y., is a folder relating to Zinolin "Arnold-ized" zinc paint, which it is claimed does not fade but remains glossy. It is referred to as the "Wonder paint" and is said to revolutionize outside painting while costing not more than ordinary white lead paint. Zinolin is the company's trade name for a new paint for all exterior painting. The statement is made that it does

(*Continued on page* 78)



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Just what the contractor, architect and builder need. Saves its cost several times over every season. An accurate, reliable, moderate-priced instrument, with all complicated and confusing features omitted. Any contractor can master this simple and easily-used level in a short time with aid of complete 16-page instruction book accompanying each instrument. WHITE'S IMPROVED LEVELS are strong, rigid—few adjustments—built to stand hard service. Why keep on using clumsy makeshifts like the spirit-level or straight edge when this up-to-date instrument, with all latest improvements, will make your work easier, prevent costly errors and boost your reputation? FIND OUT WHAT A DIFFERENCE IT MAKES—AT OUR RISK.

Write today for free catalog showing large assortment of levels and transits and latest discount sheet.

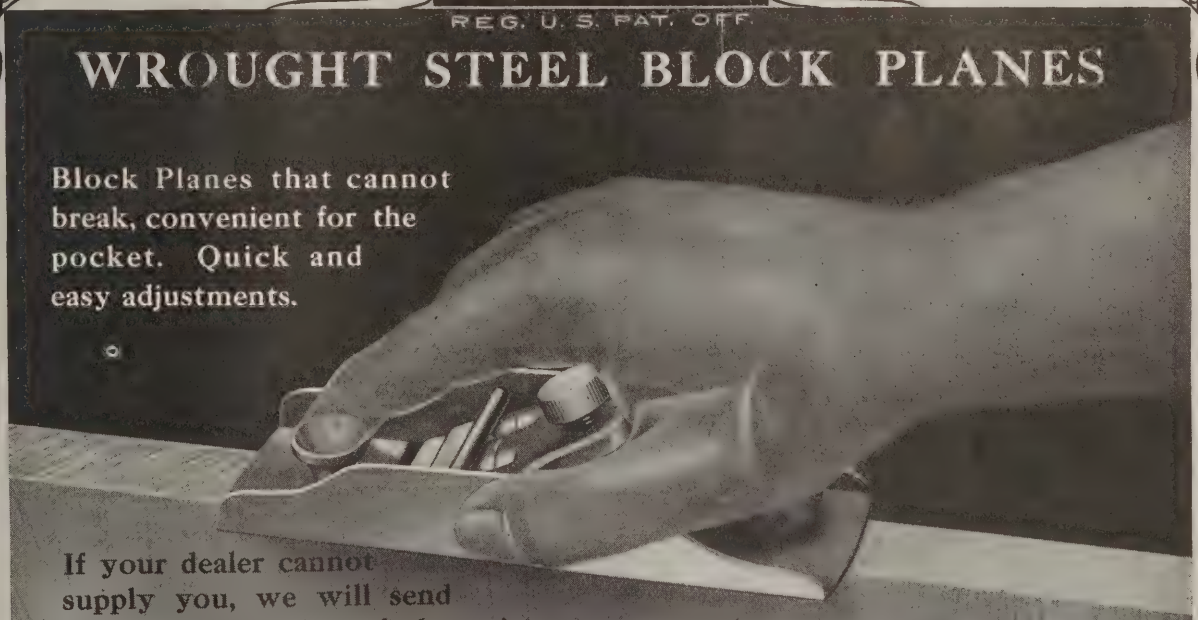
DAVID WHITE CO., Inc., 421 East Water Street, **Milwaukee, Wis.**

SARGENT

REG. U. S. PAT. OFF.

WROUGHT STEEL BLOCK PLANES

Block Planes that cannot break, convenient for the pocket. Quick and easy adjustments.

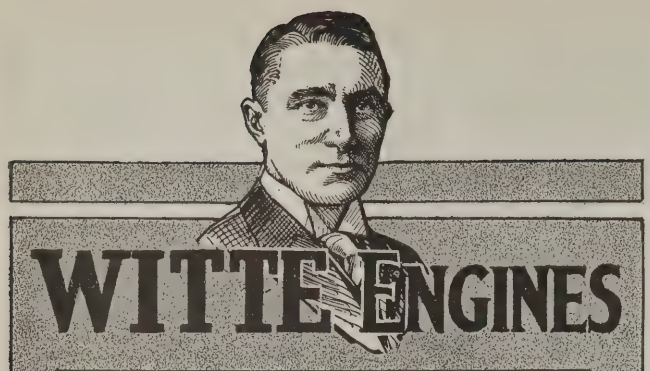


If your dealer cannot supply you, we will send prepaid, on receipt of the price,

No. 5206—6-inch Nickel Plated Plane, $1.00
No. 4206—6-inch Polished Plane, - 90 cents

For full description of Sargent Warranted Planes, send for the Sargent Plane Booklet.

SARGENT & COMPANY, Makers of Planes squares and Mechanics' Tools
53 Water Street, New Haven, Conn.



WITTE ENGINES

Gasoline, Kerosene and Gas

Engine Power Costs Less Now

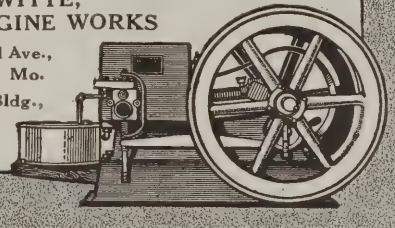
Let me send you an engine to earn its own cost while you pay for it. **Easy to start; no cranking;** easy to understand and manage; and easy to pay for on any suitable, reasonable terms of payment, during a year. I have helped many thousands to own engines in this way, during my 29 years of engine building.

See these Low Prices: 2 H-P, $34.95; 3 H-P, $52.45; 4 H-P, $69.75; 6 H-P, $97.75; 8 H-P, $139.65; 12 H-P, $197.00; 16 H-P, $279.70; 22 H-P, $359.80. (*F.O.B. Factory.*) Portable Engines and Saw-Rig outfits proportionally low. **Guaranteed high quality**—as durable as superior design, best materials and workmanship can make.

Fine Book Free. My book, "How to Judge Engines," will show you how to select the engine most suitable to your needs, and how easy it is to run a WITTE at any kind of work. Get my engine facts before you decide on any engine.

Guaranteed 5 Years

ED. H. WITTE,
WITTE ENGINE WORKS
3197 Oakland Ave.,
Kansas City Mo.
3197 Empire Bldg.,
Pittsburgh,
Pa.



Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company

not contain white lead, lithophone or barytes. Another circular calls attention to the "Seven Wonders" of the company, among which mention may be made of "Litho-ite," a liquid outside white paint which can be tinted with colors and oil to make it any shade; "Prevento," a transparent liquid for rendering cement or brick surfaces above ground waterproof and keep them so for at least two years; "Poleva," a flat enamel for wet surfaces such as baths, laundries, brewery cellars or any place where there are acid fumes; "Caveco," a paint for cement inside or out, and being made up in jelly form it is stated that one coat will finish the wall or ceiling without any preparatory coat and over any other paint.

"Simplex Junior" Concrete Mixer

An economical and well built cement and mortar mixer having capacity to mix from 15 to 25 cu. yd. per day has been put on the market by the Western Manufacturing Co., Oskaloosa, Iowa, under the name "Simplex Junior," and is shown in Fig. 8. It is stated that the mixer is of such dimensions that it can be kept close to the material and near the point where the concrete is used, thus saving time in moving materials to and from the machine. It takes up but little room and can, therefore, be used in cramped places. When the hopper is mounted it is 43 in. high, thereby allowing the workmen to shovel in the ingredients in quick time. The mixer is provided with steel mixing blades, which are so arranged that twenty-one blades move the batch forward while seven blades work in the opposite direction. This action, the company claims, gives a double mix in one operation. The body of the mixing chamber



Fig. 8—"Simplex Junior" Concrete Mixer

is made of heavy sheet steel, and all gears are carried in a heavy casing which has long sandproof bearings. Each bearing is turned and bored to a true fit and is provided with a hard oil grease cup to insure proper oiling. A continuous belt runs the full length of the hoppers and feeds the materials in an even, unbroken stream, which prevents clogging and gives a steady flow of sand or cement. Both hoppers are identical, and either may be used for sand or cement. The adjustment of materials is performed by sliding gates installed at the front of the hopper, and these may be set for any amount desired, from 1 to 1 or 10 to 1. It measures and feeds the materials accurately. Every machine has a water tank of ample capacity. The trucks are of steel. The front and rear wheels are 16 in. in diameter, with oval tires and channel steel frame. The length of the axle is 36 in. The equipment is furnished with a 1¾-hp. water-cooled gasoline engine, complete with dry-cell battery ignition, which is said to produce ample power for efficient mixing.

Roofing Facts and Figures

Under the above title a booklet of suggestions and interesting information for the practical carpenter and builder has been issued from the press for general distribution by the William L. Barrel Company, 8 Thomas Street, New York City. The little work not only tells about the long life of "Con-Ser-Tex" canvas roofing but also contains many valuable pointers for

(*Continued on page* 80)

Rent this Level 10 Months Then It's Yours

Builders and Contractors



This is not the old style Architect's Level. It is the newest 1916 model *convertible* level. There is not a single Builder or Contractor who has not almost daily need for this instrument, for laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting, walls, piers, etc., for getting angles, locating levels anywhere, ditching, laying streets and walks, running straight lines, and a hundred other uses.

Instruction Book Free

Complete illustrated booklet, telling how a builder or contractor can use the Convertible Level, sent free on request.

WARNING

The Level we offer is the new Aloe Convertible Level, 1916 model. Don't confuse the Convertible Level with the ordinary old style Architect's Level. The only work that can be satisfactorily done with the ordinary Architect's Level is the determining of elevations. But the Convertible Level, besides its use as a level, is a modified transit and broadens the use of the level 100%. You can't afford to buy any but the Aloe Convertible Level.

HALF CENTURY REPUTATION

We have been manufacturers of transits and levels since 1863, and our instruments are the standard of the world.

FREE TRIAL

We allow you to convince yourself by a trial of the instrument before you obligate yourself.

THE RENT BUYS IT

No large cash outlay needed. Just pay the rent for a few months and the instrument is your absolute property.

Send Coupon—No Obligation

Send the attached coupon today and we'll send illustrated booklet and complete details of how you can own the Aloe Convertible Level for 10 months' rent.

A. S. Aloe Co., 625 Olive St., St. Louis, Mo.

COUPON

A. S. Aloe Co.,
625 Olive St., St. Louis, Mo.

Please send free instruction book on the use of the Convertible Level, 1916 Model, and complete details of your rental plan. This request in no way obligates me.

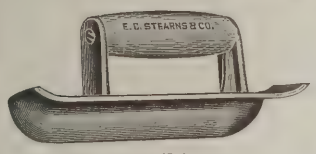
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Occupation .....

Street .....

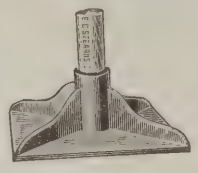
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B. A. Mar. '16



Narrow Edger

Made in Iron or Bronze—8" long x 5/8" deep. Two sizes, 3/8" radius and 3/4" radius.



Iron Tamper

With 4 ft. wood handle. In five sizes, from 6" square to 10" square.

Large Groover
V-Shaped Groove

Made in Iron or Bronze. Cut 3/4" deep x 5/8" wide. Size 9" x 3".





Narrow Jointer
Both Ends Turned Up

Made in Iron or Bronze. Cut 1/8" wide x 1/2" deep. Size 8" x 1 3/4".



Corner Tool

Made in Iron or Bronze. 6" long. Sides 1 1/2".

Stearns

Cement Workers' Tools

These are only a few of our complete line of cement workers' tools. Good value and thorough service in each one. Iron is close grained, finely polished, nickel-plated. Bronze is special hard, highly polished.

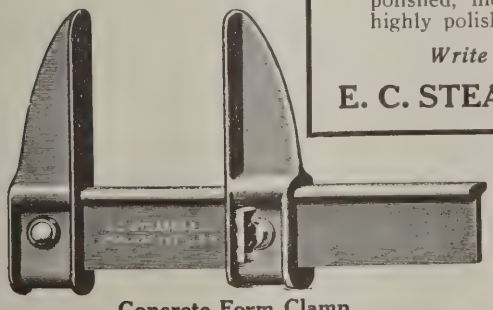
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E. C. STEARNS & CO., 400 ONEIDA STREET Syracuse, N. Y., U. S. A.



Small Groover
Both Ends Turned Up

Made in Iron or Bronze. Cut 1/2" deep x 1/2" wide. Size 6" x 3".



Concrete Form Clamp

One jaw riveted to steel bar. Other slides and is securely held by thumb screw. Depth of jaws 4". In five sizes—from 8" greatest width to 30".



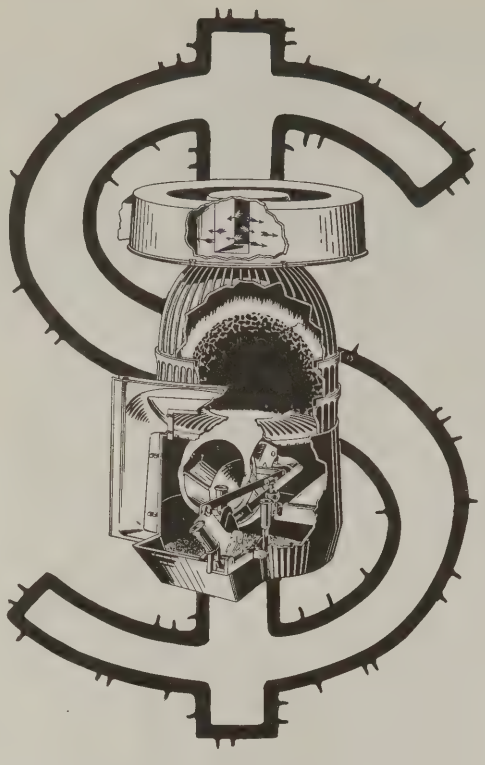
Indentation Roller

Made in Iron or Bronze. Two sizes—9" long x 3 1/4" diameter and 6" long x 3 1/4" diameter.



Edger

Made in Iron or Bronze. 6" long x 5/8" deep. Two sizes—3/8" radius and 3/4" radius.



Spells Dollars For You

Selling the *Williamson New-Feed Underfeed* Furnace or Boiler *means money in your till*—and more money. You can guarantee the customer a saving of from ½ to ⅔ of the coal cost from the time he installs an UNDERFEED—*and we back you.* Is there a stronger trade puller than that guarantee? Think what it means to you in actual sales—advertising—consumer good will—new and better business! Not forgetting that a million dollar corporation is behind the guarantee.

WILLIAMSON NEW-FEED UNDERFEED Furnaces and Boilers — CUT COAL BILLS ½ to ⅔

The "UNDERFEED" is the big sensation of the heating world—simply because it *saves money*, is *easy to operate* and *delivers the heat.* It saves because it burns cheap or slack coal with as good results as highest grades. And the UNDERFEED is smokeless, sootless, clinkerless—adapted to warm air, steam, or hot water. It delivers *clean, live heat* all the time because it's built on

The "Candle" Principle. The fire is on top of the fuel, where it plays right against the radiating surfaces—not buried under a mass of smoky, half-burned coal. Turn a candle upside down and you've got a good imitation of the old fashioned top-feed. The *UNDERFEED burns on the candle principle of an upright candle—fuel is fed from below.*

A Big Selling Success. The UNDERFEED has swept the country. Over 35,000 enthusiastic users write of warmer homes with coal bills cut ½ to 2/3. Our big advertising campaigns and *real* sales helps are making money for live furnace men everywhere.

How You Can Cash In. Put the accent on the IN when you tie up to this fast-selling line. The cash comes in from the time we start to work for you and with you to sell the UNDERFEED in your town. Get our "Exclusive Rights" proposition—now—before the other fellow. Send the coupon below. It will bring you an eye-opening offer. But act today.

The Williamson Heater Company
1932 Fifth Ave., Cincinnati, Ohio

Tear Out and Mail NOW

The Williamson Heater Co.,
1932 Fifth Ave., Cincinnati, Ohio.

Send me a copy of "Money-Making Sales Plans for UNDERFEED Dealers" and full details of your "Exclusive Sales Rights" proposition. This request is to involve no obligation on my part.

Name .....

Address .....

.....

Business .....

making larger profits on repair jobs and new buildings. "Con-Ser-Tex," it may be stated, is a canvas roofing chemically treated to preserve the fiber from mildew and the detrimental action of the oil and paint. The claim is made that unlike most roofing fabrics it remains unaffected by the weather. It is used with great satisfaction to the owner and economy to the builder and contractor for porch and house roofs, piazza and other floors. A copy of the booklet can be secured by any reader of THE BUILDING AGE by sending his request to the company.

The Hill Balcony Dryer

In connection with those houses where yard room is not available for drying clothes, it is generally recognized that one of the most convenient arrangements for the purpose is a balcony dryer as shown in Fig. 9. This device is intended to be hung from piazza posts, from the side of a building, fire-escape or window balcony, the arrangement being such that when the lines are filled the dryer is swung clear of the building as shown in the illustration. The swing arms are made of steel and the dryer top is fastened open and locked to the post by a patented device which makes it impossible for it to be blown off. The castings are galvanized and the arms painted a light chrome yellow. The device is especially convenient for apartment houses,

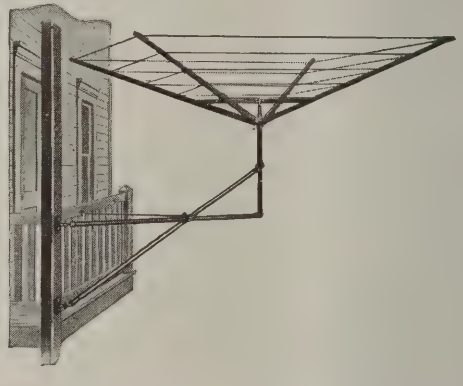


Fig. 9—The Hill Balcony Dryer as it Appears When Ready for Use

flats, etc., and does away with the unsightly pulley lines which are a conspicuous feature of the rear areas of these buildings in the larger cities. The dryer here shown has four arms, each 5 ft. 6 in. long, holds 110 ft. of line, and is made by the Hill Dryer Company, 318 Park Avenue, Worcester, Mass.

Eureka Batch Concrete Mixer

An attractively illustrated folder setting forth in detail the merits and construction of the 5-6 Eureka batch mixer has just been issued from the press by the Eureka Machine Company, Lansing, Mich., and with representatives in the principal cities of the country. The special features of this mixer are minutely described in comprehensive specifications which occupy a double page of the folder, with a picture of the mixer in the center and having leaders pointing to the salient features. The company states that the machine has a foundation of unusual strength and compactness, that the heavy drum and load is situated over the rear end of the frame, while the power is in the front, this being referred to as a positive step in advance of mixers with the arrangement reversed. The drum rollers are built on the principle of a railroad truck, and emphasis is laid upon the fact that large drum rollers wear longer and require less power than others. The machine has a low-down, easy-charging side loader that will not clog, a counter shaft with clutches and driving pinion, an all-steel batch hopper, a self-measuring pressure water tank, a "new-way" engine for motive power and a steel housing for protecting the mechanism from

(*Continued on page* 82)

The HESS STEEL PIPELESS FURNACE



is a most decided success. Customers who are using them report surprising efficiency in producing and circulating warm air, economy in fuel, and general satisfaction.

The HESS STEEL PIPELESS FURNACE

is provided with one large register only, directly above the heater. The central part of the register is the heat outlet and warm air is delivered through it into the main room above the heater. The two ends of the register are cold air return openings, and the cold air flows through them and downward, around the outside of the furnace, to the bottom. It then ascends through the middle chambers of the heater and returns, properly heated, to the rooms.

The temperature of all rooms opening into the main room where the register is situated is kept uniform and comfortable. The upper rooms are tempered by ceiling registers.

This method is ideal for *cottages, bungalows, stores,* etc., but is not intended for houses where there are rooms distant from the furnace to be heated. For such houses we recommend our regular steel furnace, *with separate pipes and registers.*

This is a fine proposition for contractors and builders, to whom we make special terms and concessions. Write for particulars.

HESS WARMING & VENTILATING CO.

1201 Tacoma Building, Chicago

Makers also of the Hess White Steel Medicine Cabinets.

SAVING STEPS

with an

Amherst Furnace



No woman likes to run up and down the cellar stairs several times a day to tend the furnace. She doesn't have to while the *Amherst* is on duty. Hubby loads it morning and night, and the furnace then takes care of itself.

Here is a perfect heater, proven absolutely dependable by many years' service—a heater you can freely rely on to uphold your reputation for fair, square dealing.

Show us roughly the plans of house you're building, and we'll submit heating plan and cost. Get our catalog anyway.

Buffalo Co-operative Stove Co.

Buffalo, N. Y.

Profit for YOU
Selling "One-pipe" Heaters

Hammer, saw and screwdriver only tools needed to install this new furnace. Heats whole house effectively and economically. You can find many stove-warmed houses where you can *sell* an

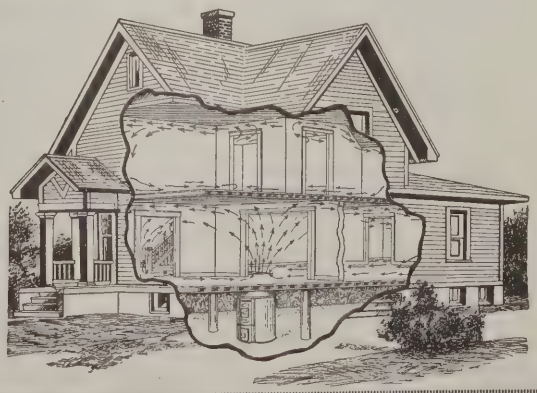
INTERNATIONAL "One-pipe" Heater

and make a profit. Guaranteed on 60-day trial basis. Made by concern over sixty years old and manufacturing largest line of heating apparatus in America.

APPROVED BY · FRESH AIR HEAT MEANS HEALTH · TRADE MARK ·

Write for Special Proposition and Booklet. Opens up a new field for profits, without affecting your present business. Talking "heating" often gives opening for talking "house repairs."

INTERNATIONAL HEATER CO.
Brick St., Utica, N. Y.





WILLIS PRODUCTS

Specify WILLIS SKYLIGHTS and VENTILATORS for Schools, Factories, Churches, Barns, or any of your coming Jobs, where plenty of light and pure fresh air are required.

We make Skylights and Ventilators of all sizes to suit your needs. Any of your men can put them in place. NO SOLDERING. Only an ordinary hammer and screw-driver needed.

We want CONTRACTORS and BUILDERS to have our complete Catalog of *SHEET METAL BUILDING MATERIALS*. Quality and best prices are in WILLIS products. Here is a chance for you to make money on all your jobs. WRITE US. We will tell you how. A postal brings our complete Catalog.

Department A

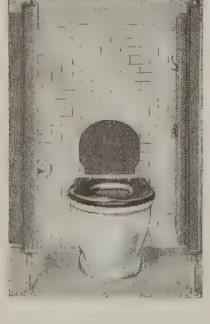
WILLIS MFG. CO., Galesburg, Illinois

What this man has done, you can do!

Mr. Pharis found big profits in selling the

KAUSTINE WATERLESS Sewage Disposal System

A Real Closet but no water



He says: I took the agency for Kaustine Closets six months ago. I have sold 41 outfits, 30 to schools. I am planning to devote my entire time to this business the next year. A $50 Kaustine System will add $100 to the selling value of a house.

Yours respectfully,
H. C. PHARIS.
Saginaw, Mich., Sept., 1915.

Builders who specify and install Kaustine Closets in their building jobs make added profits and gain reputation.

This is a sanitary era. Get in line!

Special builders' offer ready for you. Write now—today.

Kaustine Co., Inc.

Dept. B1 **Buffalo, N. Y.**

dust and dirt. The policy of the company is stated to be "a good mixer at a reasonable price."

Mims Clamp for Concrete Forms

In these progressive days when concrete is so extensively used in connection with building construction of all kinds, contractors are interested in the appliances which are being brought out to facilitate this sort of work. Among the later candidates for popular favor in the way of a clamp for concrete forms is that which has been placed upon the market by J. R. Mims, Luray, Va., and the general application of which is shown in Fig. 10 of the engravings. The invention consists of a number of bars having their ends overlapping as shown in the illustration. One end of each of the bars has a series of holes so as to permit the bars to be pivoted at this end, while the other ends are provided with notches. A lock plate, provided with slots, is placed over the overlapping notched ends in such a way as to hold them firmly in position. The device is also provided with a locking lever for drawing the boards together so that there will be no cracks in the "form." The manufacturer states that in constructing columns where the clamps are used it is only necessary to get out a piece of the proper width and nail a 1 x 2 in. batten at each end, and where the columns are unusually long a batten is placed in the center to hold the boards together until the clamps can be put in place. After the clamps have been adjusted to the proper size, a lock plate is slipped into place, the locking lever is inserted in the holes at

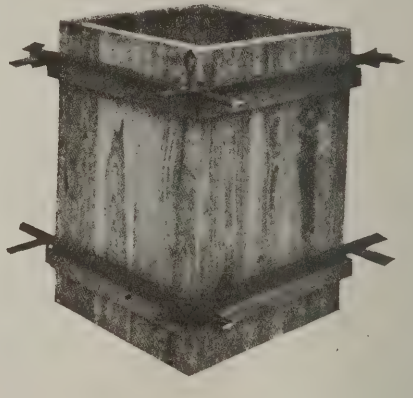


Fig. 10—The Mims Clamp for Concrete Forms

the end where the notches are located and the clamps are drawn together until all the cracks in the boards are closed. After the columns have been filled with concrete and the "forms" are ready to be removed the bolt at the adjusting corners is taken out and the clamps released. As the bolts are made tapering they can readily be driven out. The clamps are made from cold rolled steel and are adjustable from 12 in. to 30 in. square. They are also made for larger columns when necessary. All bars are made by the same templet, thus saving time in assembling the clamps.

Convention of Branch Managers of Trussed Concrete Steel Company

The first annual convention of the branch managers of the Trussed Concrete Steel Company was held at the main plant in Youngstown, Ohio, the last week in January and was notable in many ways. Not only was every section of the country represented, but managers were present from Japan, Hawaii, South America and Porto Rico, there being fully 100 men in attendance. The general program included business sessions morning and afternoon. President Julius Kahn gave the opening address, followed by an interesting talk and discussion on "Shop Practice" by T. H. Kane, manager of the works. The noon recess was devoted to the inspection of the manufacturing operations. P. M. Louwerse, manager of the Sash Department, gave an interesting talk on "Steel Sash," and branch managers participated in the discussion which followed, telling of their experiences in various parts of the country.

(*Continued on page* 84)



The Economy of the FEDERAL Proves a—

"very profitable investment"

That's what this prominent lumber company says comparing Federal Service with other trucks and other transportation methods they have used.

W. A. C. MILLER COMPANY
1080 Vinewood Avenue
Detroit, Mich.

Jan. 4th, 1916.

Federal Motor Truck Co.,
Detroit, Michigan.

Gentlemen:

In reply to your favor of December 31st, relative to the operation of our 1½-ton Federal motor truck, will say that this truck has given us very satisfactory results.

During the four months we have had this truck it has cost us just 30c for actual repairs.

During our busiest season our truck made an average of 6.59 miles per gallon of gasoline under an average load weight of 2550 lbs., which we consider is very low, in comparison with other trucks that we have had, and we feel that we have made a very profitable investment in the purchase of this make of truck.

Yours very truly,

FCN/GHK W. A. C. Miller Company.

You owe it to yourself and to your firm to have us at least show you what other concerns in the lumber and building fields have saved with Federalized Transportation. Write today—

Federal Motor Truck Company
562-570 Leavitt Street
Detroit, Michigan



Tested by Chemists Every Hour—Day and Night

DESPITE standardization, the making of Portland Cement is—as an authority recently expressed it—"an extremely scientific proposition requiring the exercise of the greatest care and long experience. It is a scientific and chemical procedure representing the antithesis of guess-work or slip-shod methods."

Is it not well, therefore, in selecting cement that is to become the very sinew of your construction, to choose the product of a manufacturer whose present-day output represents 25 years of experience in cement making—who has made the chemist a man of real authority in all plants—who has for years followed a strict system of hourly tests to insure exact proportioning, thorough burning and grinding that will more than meet standard requirements?

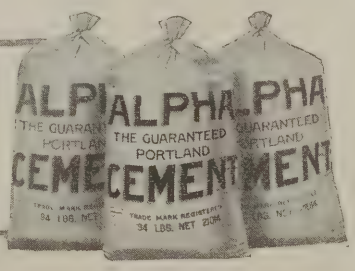
Under the ALPHA system of supervision it is impossible for cement that lacks binding power to be shipped out. ALPHA CEMENT costs no more than other good Portland Cements.

Six great plants on six trunk-line railroads—capacity 25,000 barrels daily—enable us to render ALPHA service that is on a par with ALPHA quality.

Let us send you our Art Envelope No. 17, containing illustrations of distinctive concrete constructions, and a copy of the 80-page book, "ALPHA CEMENT—How to Use It."

ALPHA PORTLAND CEMENT COMPANY, General Offices, Easton, Pa. Branch Offices: New York, Philadelphia, Boston, Pittsburgh, Baltimore, Savannah.

Tested Hourly and Guaranteed



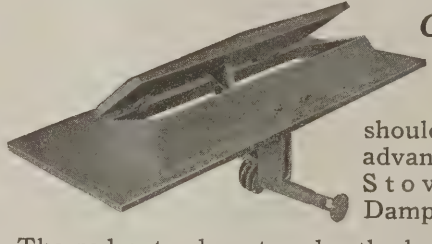
Are You Building Garages This Spring?



Stanley's Garage Hardware will insure you a fine looking satisfactory job. Send for illustrated booklet "E" with information about Garage Hardware. Write to-day.

THE STANLEY WORKS, New Britain, Conn.

FIREPLACE MATERIAL



Every Contractor building fireplaces should know the advantages of the Stover Dome Dampers.

The rod extends out under the brick or tile so there is no interference after the Damper is first set. Wide flanges allow giving sides of Fireplace any angle desired. Cover will not slip out of position. Castings are extra strong. Made with or without angle for carrying brick. We make other styles.

Catalog No. 1550 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets. Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches. Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

Stover Mfg. Co.
747 East St.
Freeport, Ill.

SEND COUPON TODAY
Stover Mfg. Co., 747 East St., Freeport, Ill.
Send the undersigned information regarding your
Name.....
Business.....
Address.....

Other topics discussed were "Reinforced Concrete," "Engineering Practice," "Experiences with Reinforced Concrete," "Metal Lath," "Methods of Distributors," "Kahn Mesh Reinforcement," "Concrete Pavements."

A program of entertainment had been prepared including, on the opening night, special motion pictures of Oregon views followed, by a buffet luncheon; on the next night a banquet at the Hotel Ohio, the hall being specially decorated and arranged for the occasion with special company songs and many interesting toasts, and the following evening was "Trussed Concrete Night" at the Hippodrome Theater. Curtains carried banners of welcome and the actors had been coached and poked fun at some of those in attendance. After the performance a buffet luncheon was served in the grill room in the Hotel Ohio.

Berger's Steel Cores for Concrete Floor Construction

A form of pressed steel core or tile for use in connection with concrete floor construction and one which is rapidly growing in popularity throughout the country is illustrated in Fig. 11 of the engravings. It is designed to give great strength and displacement for the least amount of weight and cost, at the same time making a great saving in concrete, reinforcing steel, centering and labor, as well as greatly reducing the dead floor load. The cores which are made in the lighter gages are for "left-in" construction while the heavier gages may be removed and used again and again indefinitely. The cores are made with 20-in. base for joists, 24-in. centers and cores with 25-in. base for concrete joists 30-in. centers. The point is made that the cores can be shipped to any part of the United States at a very low freight rate owing to the

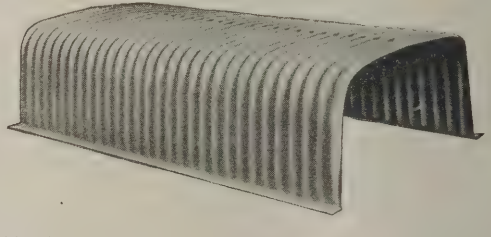


Fig. 11—General View of Berger's Steel Core for Concrete Floor Construction

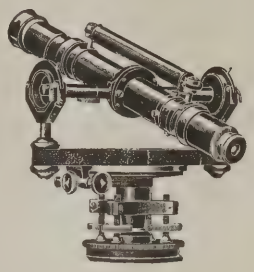
fact that one car of cores will cover an area equal to twenty cars of clay tile. The cores are made by the Berger Mfg. Company, Canton, Ohio, which will cooperate with architects, engineers and contractors, furnishing them with complete designing data that will enable them to economically lay out concrete floor construction by the use of these steel cores.

Catalog of Wire Work

One of the most attractive catalogs illustrating and describing wire work of all kinds which has come to our notice is that now being distributed to the trade by the Buffalo Wire Works Company, 446 Terrace, Buffalo, N. Y. The volume consists of 176 pages profusely illustrated with halftone and line engravings showing a few of the many uses of "Buffalo" wire cloth and the various kinds of ornamental designs the company has executed. In addition there is a number of carefully compiled tables showing the various sizes of wire, weights, sizes of opening in the different meshes and metric measurements—in fact all general information pertaining to the company's line. Attention is given to ornamental floor railings, elevator cabs and inclosures, wire baskets, folding gates, partitions, fireplace screens, lawn fences, settees, wall guards or partitions, wire bins, wickets, grills, ornamental panels and guards, etc. The company states that inasmuch as the list prices of all wire cloth have been changed it is suggested that all previous copies of catalogs now on file be destroyed, as all prices quoted after Jan. 1, 1916, will be in accordance with the list prices in the new catalog. Those of our readers who

(*Continued on page* 86)

Kolesch "Builders" Tilting Level No. 7850

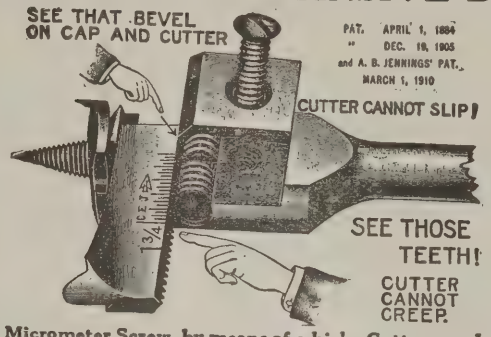


Designed particularly for the leveling and plumbing of walls, giving lines and levels for buildings, laying out angles, grading streets, sewers, drains, etc.

Sturdily built for durability, yet sensitively accurate. Sold complete in a polished box with plumb bob, adjusting pins, metal trivet, book of instructions, and tripod for $57.50.

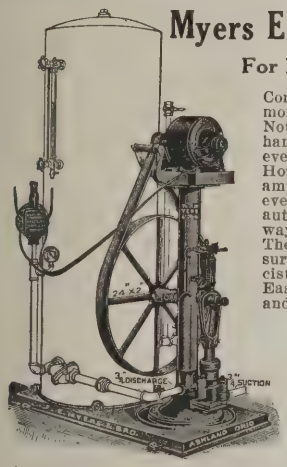
KOLESCH & CO.
138 Fulton Street New York, N. Y.

C. E. JENNINGS STEERS PATENT EXPANSIVE BIT



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. *Sole Mfrs.* **71-73 Murray St., N. Y.**



Myers Electric House Pumps

For Home Water Supply

Conveniences for the household are more in favor than ever before. Nothing is more appreciated than a handy water supply, for water is an everyday necessity. Myers Electric House Pumps will furnish water in ample quantities, without labor and even without attention, for they are automatic in operation and will always keep the supply tank filled. They may be used wih open or pressure tanks. Will pump water from cisterns or wells of any depth. Easy to install, economical to operate and satisfactory always.

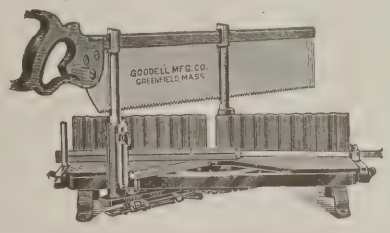
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Ashland Pump and Hay Tool Works

No Cast Iron Here

This Mitre Box is **All Steel.** Not an ounce of cast iron in it. What's its name? Why, the **Goodell,** of course.

Steel Truss Frame or Bed, Cold Rolled Steel Corrugated Back, Wrought Steel Lever or Saw Support. Automatic Detents for Holding up Saw. Steel Bottom Plates with Angular Serratures. Long Saw Guides and Many Other Features.



Write for new *Circular K* describing the box that cannot break.

GOODELL MFG. CO.
Greenfield, Mass.

Pearson's Automatic Shingle Nailer



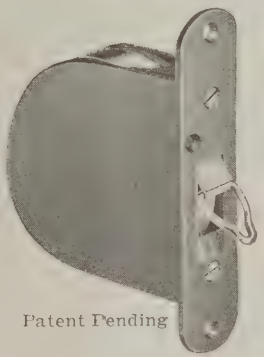
Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

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List price $7.00 (but an order from this ad will bring you either size by prepaid parcel post for only Five Dollars).

Pearson Mfg. Co.
Robbinsdale, Minnesota
Makers of Hand Nailing and Tacking Tools

CALDWELL SASH BALANCES UNIFORM MORTISES



For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

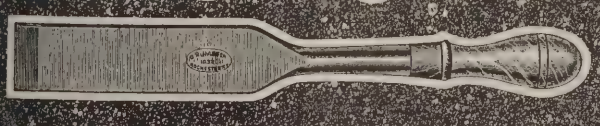
Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Patent Pending

Write for circular

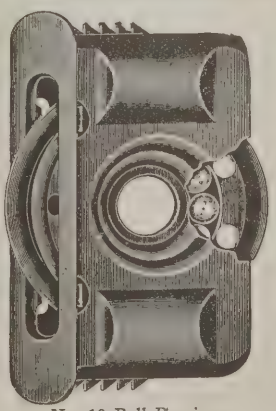
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MACK & CO.



YOU will always feel secure when you use Barton Planes and Edge Tools. The making of keen edged tools that hold their sharpness is our hobby. If your dealer won't supply you we will.
There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

Brown's Race & Platt St., Rochester, N.Y.



"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

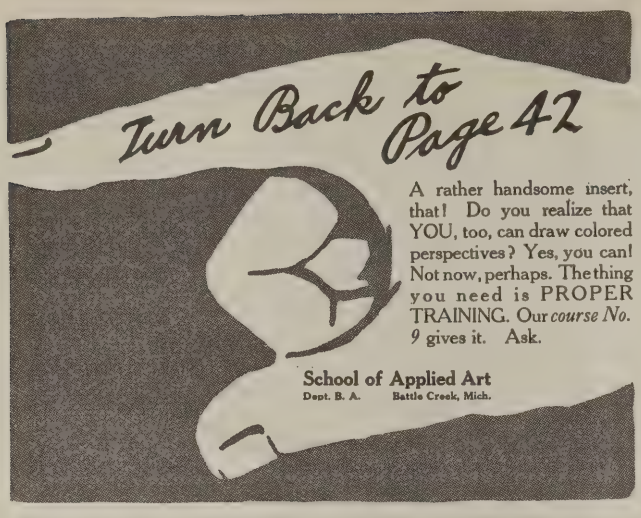
The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

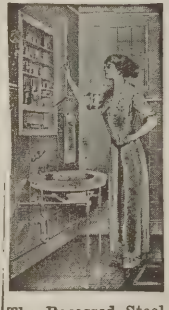
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Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.



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The Only Modern, Sanitary STEEL Medicine Cabinet



or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

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Four styles — four sizes. To recess in wall or to hang outside.



The Recessed Steel Medicine Cabinet

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359 Funck St., Sumner, Wash.
Capital $1,000,000 Not in any trust or combine

are interested in wire work can secure a copy of the publication in question by writing to the company for catalog No. 8-H.

Booklet on Economical Gas Making

Readers of THE BUILDING AGE residing in rural and suburban sections which are isolated from public gas supply for lighting purposes are likely to be interested in a booklet relating to the Tirrill "Equalizing" gas machines which has just been issued from the press by the Tirrill Gas Machine Lighting Company, 103 Park Avenue, New York City. This booklet, which is being mailed free on application to any address, gives many interesting details of this gas machine and also describes gas burners and gas appliances of all kinds for every conceivable purpose.

The International "Onepipe" Heater

One of the latest developments in the solution of the heating problem, and one in which architects, builders and house owners generally are interested, is the device illustrated in Fig. 12 of the engravings. It represents a broken view of the International "one-pipe" heater, the arrows clearly indicating the course of the air currents. The construction is such as to render the operation readily understood, and as the heater is delivered in "knocked-down" shape, all that is necessary in erecting it is to select a suitable place in the cellar, near the center of the house if possible, and follow the directions of the manufacturer. All the tools required are

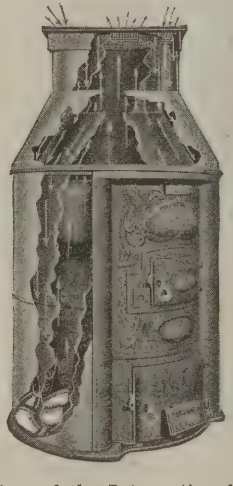


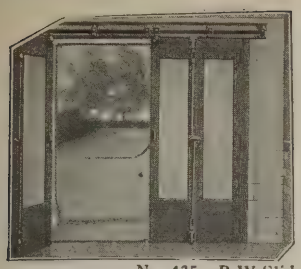
Fig. 12—Broken View of the International "Onepipe" Heater

a screwdriver, a saw and a hammer. The inner casing is lined with tin and asbestos to retain the heat until it is absorbed by the air passing through. The point is made that the outer casing is always cool so the cellar will not be heated. In operation, which the manufacturer claims is positive, the warm air flows up through the center of the register, passing at once to the ceilings of the various rooms and "flooding the house with warmth." The colder air falls to the floor, then down through the outer section of the register between the outer and inner casings of the heater, and is then rewarmed and recirculated. The smaller size is designed to warm a house having from six to eight ordinary size rooms, while the larger size is intended for warming a house of eight to ten rooms. The device is made by the International Heater Company, Hickory Street, Utica, N. Y.

Millers Falls Tool Catalog

The Millers Falls Company, Millers Falls, Mass., has recently issued a new catalog, No. 35, of the Millers Falls tools. The book is well printed and illustrated on good quality of paper and shows complete lines of hand vises, drilling machines, auger handles, automatic boring tools, boring machines and augers, various kinds of drills, saws, chisel grinders, chucks, motor boxes, soldering sets and braces. Special atten-

(*Continued on page* 88)



No. 435—R-W Sliding-Folding Door.

When Garage Door Equipment is needed

When the garage is decided on, its size and construction, the next question is, how to hang the doors.

Here are illustrated two popular sliding door arrangements in the line of

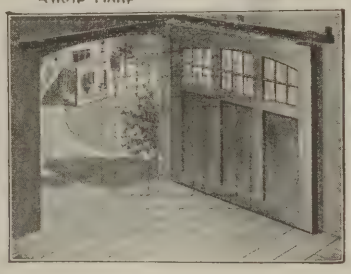
R-W Garage Door Outfits

No. 435 R-W Sliding-Folding Door Hangers can be used on the small private garage as well as the large public garage. For the public garage the doors can be arranged so as to be operated by electric motor.

No. 235 R-W Right Angle Door Hangers give an ideal arrangement and are very generally used.

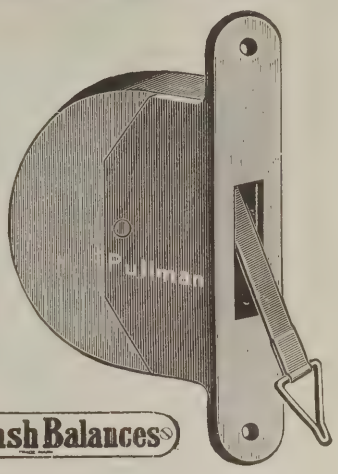
Ask for special Garage Door Equipment catalog or Locking Garage Door booklet.

No. 235—R-W Right Angle Door



Richards-Wilcox Manufacturing Co.
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Pullmanize Your Windows



Cord is unsightly and soon wears out. Weights are clumsy, hard to handle and usually noisy. Chains also have their objections. All these are fast giving way to the modern

Unit Sash Balances

which are neat, smooth operating and very durable. They also make it possible to use the extremely narrow mullion now so much in vogue.

More than that, Pullman Unit Sash Balances permit using a more solid and better frame. Made with uniform size face-plates, so that the mortises can all be cut at the mill when the frames are made.

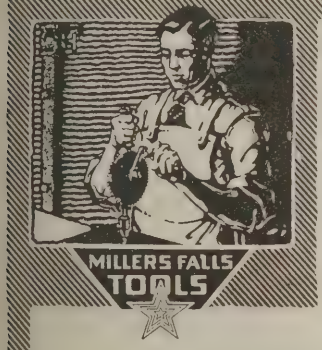
Our 10 years guarantee protects you fully.

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We warrant them entirely satisfactory whether you build, remodel or repair.

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A Handy All Round Tool

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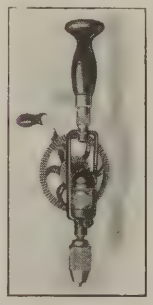
MILLERS FALLS
HAND DRILL No. 980

just right for light or heavy drilling. Takes drills up to 3/8" so that it does the work of both hand and breast drill.

Steel pinions and shifting device are enclosed for protection.

Star 3-jaw chuck. Ball thrust bearings, hollow end handle that will hold twist drills, and mushroom head that can be used as a body rest.

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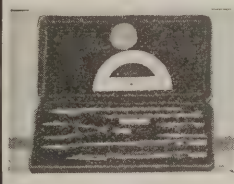
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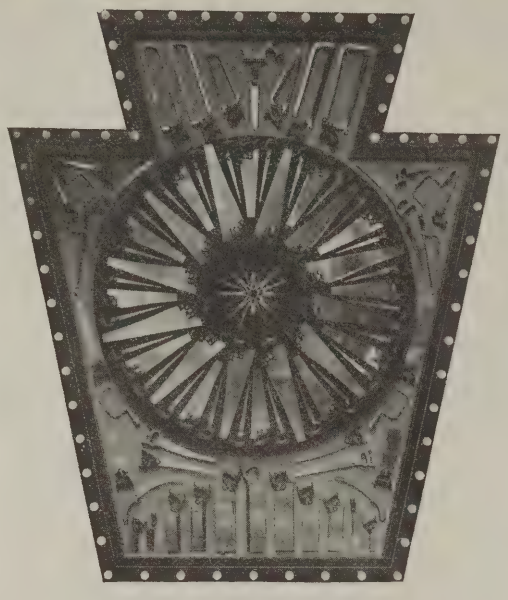
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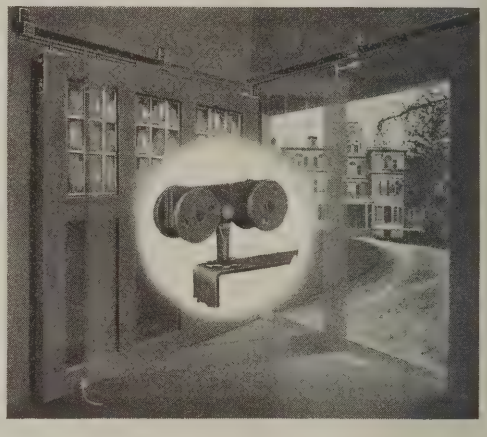
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Philadelphia, U. S. A.

tion is called to four new ratchet braces, fifteen new styles of hand drills, eleven new styles of breast drills, a new boring machine, three new automatic boring tools, a new "Lion" lathe chuck, four new styles of hack-saw frames, a new coping saw, a new fret frame set and a new lathe.

New Lane Garage Door Hanger

Lane Brothers Company, Poughkeepsie, N. Y., has recently placed upon the market a new garage door hanger embodying a number of features of special interest to the architect and builder. It is a well-known



New Lane Garage Door Hanger—Fig. 13—One Plan of Arranging the Doors and Showing Hanger in the Insert

fact that there are many situations constantly developing in the construction of modern garages where the plain, old-fashioned swinging or sliding door is not at all convenient even if not impossible. In such cases one or the other of several plans suggested in a "Bulletin" sent out by the company is sure to meet the required conditions. One plan is particularly adapted to private garages where a wide opening such as that required for two cars is desired and unobstructed in the center. Another plan is the reversal of that just mentioned, which brings the doors inside the building when opening. A third is a modification of the second, but keeping the doors inside the line of the sill and the jamb. This requires a hanger swivelled at the extreme edge of the door, but not projecting beyond it. A fourth plan involves an equipment which operates easily and is quite extensively used on public and private garage entrances. One side of this plan is shown in Fig. 13 of the illustrations, while Fig. 14 shows an ar-

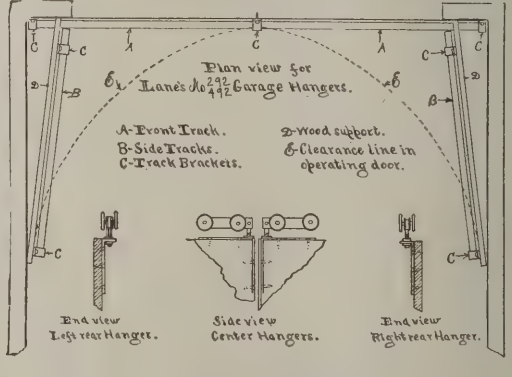
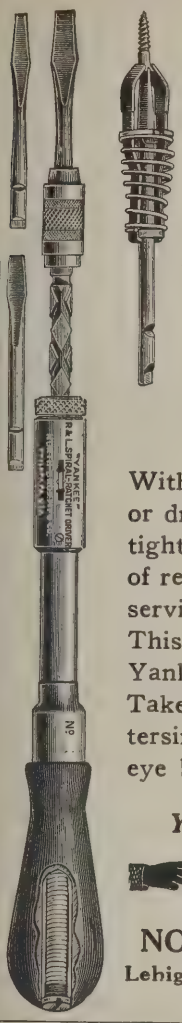


Fig. 14—Another Arrangement Suggested for Hanging the Garage Doors

rangement which enables the employment of a single trackway across the front owing to the fact that the wheels set back from the door edge and do not interfere when the doors meet edge to edge at the center. This arrangement involves the use of the new style hanger and allows the door not only to set snugly against the jamb in closing, but also hangs back of the side rail against the wall when not in the open

(*Continued on page* 90)



Look at This

"YANKEE" No. 131

Large Size

QUICK RETURN

With Spring in Handle

A quick and powerful tool for house carpenters. Drives most any size screw, large or small, and in about one tenth of the time of an ordinary driver. With the screw holder you can drive or draw a screw 3 feet overhead, in tight corners or most any place out of reach. Besides, you get the same service as with the Yankee No. 31. This is the quickest and strongest Yankee Driver made.

Takes the drilling attachment, countersink, screw holder bit and screw eye bit used in the No. 31.

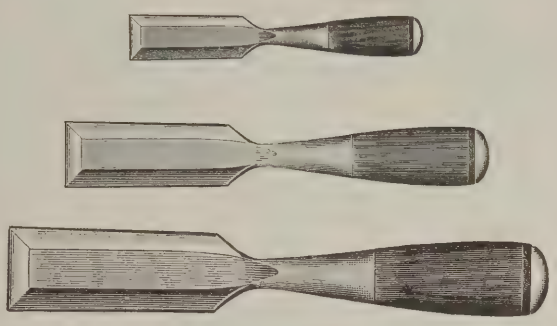
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STRONGEST—FASTEST—MOST DURABLE CHISELS MANUFACTURED.

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Exceptionally Well Made and Highly Finished.

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1853 BUCK BROS. 1915

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Buck Brothers' Tools are LASTING tools—they keep their edge.

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A New Adze

No. 44-B

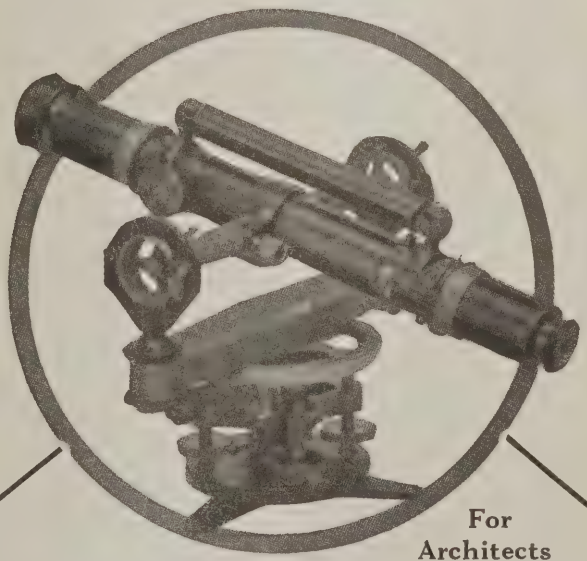


The demand was so great that we had to make it. Similar to our No. 44 ship adze, only lighter and shorter from the eye to cutting edge. Ask your dealer to see one of these. We really believe it will suit you.

Remember This:

When you want the highest class edge tools of any kind, insist on White's.

The L. & I. J. White Co.
100 Perry Street
Buffalo, N. Y.



For Architects Builders Contractors

Improved Convertible Level

Can be used as a Level and instantly converted into a transit. Our patented Axis makes this possible in half the time required by the old type instrument.

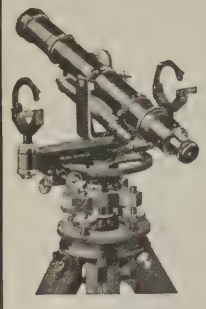
An accurate, durable instrument at a moderate price.

Write for circular of level and for catalog of drawing material.

New York Blue Print Paper Co.
58-60 Reade St., New York



Be Prepared for a Big Building Season



by equipping yourself with a reliable instrument. Now is the time, before the rush of new work begins, to investigate the merits of

"Sterling" Convertible Levels

You may do this without obligation and entirely at our expense. A comparison with other instruments will reveal the "Sterling" advantages.

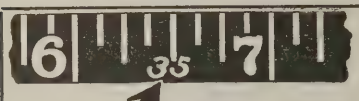
Send for illustrated pamphlet, "Facts," showing several new models.

Designed and made by

Warren-Knight Co.

136 N. 12th Street Philadelphia

All makes of transits and levels repaired.



DIETZGEN Steel Tapes

can be read at a glance. ***Simplified - Reading*** and ***Black Finish*** does it.

Saves time — delay — mistakes.

Superior accuracy and guaranteed for durability

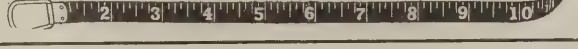
Figure here shows number of feet —this reading shows 35 feet 6½ inches

Ask for Catalog "B"



Eugene Dietzgen Co., Manufacturers

Chicago New York San Francisco New Orleans Toronto Pittsburgh Philadelphia





Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

FINISH THE JOB RIGHT

Use The "Ideal Gutter"

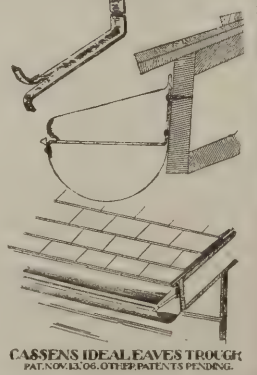
Cassen's Ideal Eaves Trough overcomes the disadvantages of the old-style open gutter. It insures clean, healthful cistern water. It is never clogged.

Have you seen it? If not we want you to try it. If "The Trough with the Lid" doesn't beat anything you have ever seen in the gutter line, tell us and you get your money back.

Write us for full particulars.

CASSENS MFG. CO.

Edwardsville, Ill.



CASSENS IDEAL EAVES TROUGH
PAT. NOV. 13, '06. OTHER PATENTS PENDING.

position if sufficient length is provided in the front track for a clearance for the hanger truck.

A New Lock Striker

An adjustable lock striker that will eliminate the cutting of door casings when the door sags has been placed on the market by the Wiley Hardware Manufacturing Co., 746 First National Bank Building, Chicago, Ill. When the latch bolt is out of line the inner plate of this device may be adjusted to the proper position by the removal of the screws, so that the simple operation is the removal of the holes instead of the plates. These strikers are made in two qualities, from cold rolled steel and from solid brass in a variety of finishes. Each one is adjustable for right or left door strike. Their full length is 6⅜ in., the size of the upper opening ¾ x 9/16 in. and the lower opening 1¼ x 7/16 in.

New R-W Door Closer and Check

One of the latest additions to the Richards-Wilcox line of specialties is the door closer and check illustrated in Fig. 15. In the production of this device the old, time-tried principle in checking mechanism by the use of crank and pitman has been improved and simplified. All working parts used in the checking cylinder are made of steel drop forgings. The spring used is such that it is impossible to overwind it, while the tension can be adjusted to suit conditions by the pawl and tooth dog. The claim is made that by reason of the original construction the check is leakproof, while the liquid—

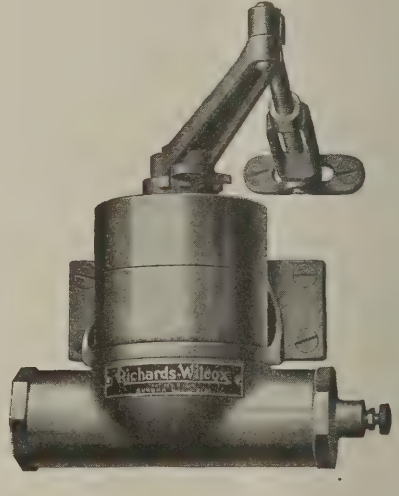
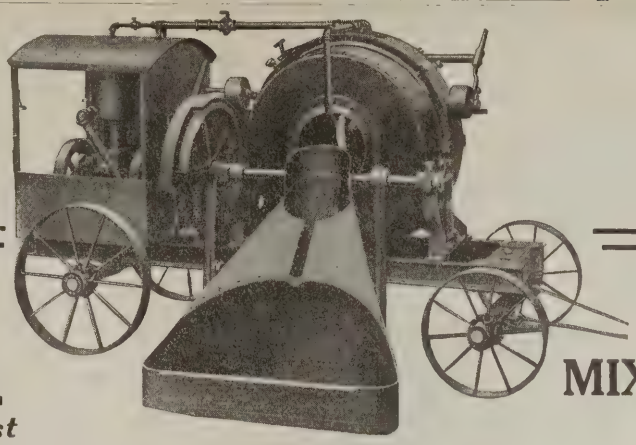


Fig. 15—New R-W Door Closer and Check

a non-freezing oil—in which the main working parts are immersed, "has high lubricating qualities." The working parts are made of gray iron, malleable iron and steel drop forging, machined to a perfect fit, and are interchangeable. No special wrenches or tools are required in assembling or winding up the spring, while a screwdriver is all that is necessary to take the check apart. The device is known as No. 643 and is made by the Richards-Wilcox Mfg. Company, Aurora, Ill.

The General Fireproofing Company, 303 Logan Avenue, Youngstown, Ohio, calls attention to the fact that the success of a stucco job depends very largely upon the lath to which the stucco is applied, and that that is the reason why builders prefer "Herringbone" rigid metal lath to other styles. This particular lath has strong, lengthwise ribs which stiffen each sheet, thus rendering it easy to work, while at the same time the rigidity saves plaster by eliminating the pockets which form in lath that sags between the studs. The company has issued a catalog relating to Herringbone lath, and a copy of it will be sent to any interested reader who may make application for it.

(*Continued on page* 92)



MIXERETTE
Without Hoist

ALL-STEEL, hot riveted construction.

CAPACITY 3 cubic feet of wet mixed concrete per batch.

OUTPUT 40-60 cubic yards of perfectly mixed concrete per day.

STEEP SPOUT empties drum in 9 seconds.

GEARED LOADER lifts easily and discharges quickly.

BATCH HOPPER feed level is only waist high.

LOW-CHARGING PLATFORM is only 16 inches high.

MAIL THE COUPON

Which?

MIXERETTE
With Hoist

THE ONLY MACHINE specially designed for a combination mixer and hoisting rig.

THREE BATCHES AT ONCE— loading, mixing and hoisting.

INDEPENDENT OPERATION — run engine only, engine and mixer, engine and hoist, or all three.

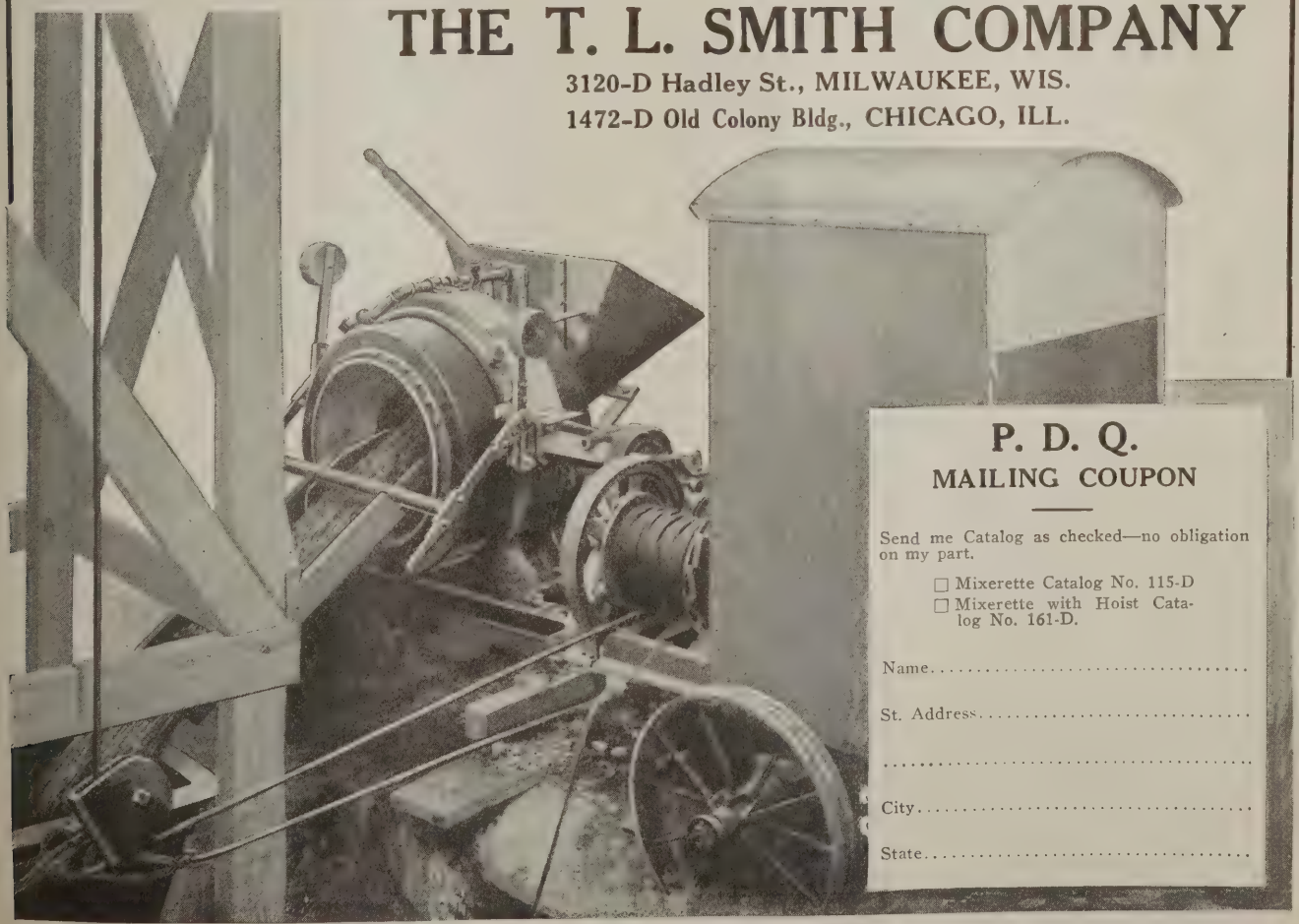
CAPACITY OF HOIST with batch in drum 300 lbs.; with drum empty 500 lbs.

HOIST DRUM holds 100 ft. 5/8" rope, 200 ft. 1/2" rope, 350 ft. 3/8" wire cable, 800 ft. 1/4" cable.

MAIL THE COUPON

THE T. L. SMITH COMPANY

3120-D Hadley St., MILWAUKEE, WIS.
1472-D Old Colony Bldg., CHICAGO, ILL.



P. D. Q.
MAILING COUPON

Send me Catalog as checked—no obligation on my part.

☐ Mixerette Catalog No. 115-D
☐ Mixerette with Hoist Catalog No. 161-D.

Name.....

St. Address.....

.....

City.....

State.....



What are *you* going to do?

IDEAL
CONSTANT SERVICE
POWER

Are you going to be content with your last year's equipment?

—or are you going to forge ahead and adopt for your 1916 work Constant Service Equipment?

Picture for a moment an engine with the latest improvements—

Simple in construction and requiring no skilled labor to operate—

With power to more than handle the work given it—

With strength to withstand the most exacting service—

With a pulsing, live action that insures "Constant Service" for your equipment—

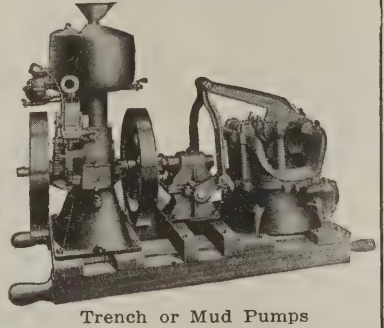
You can almost see the dollars of extra profit rolling in when you equip with—

Ideal Engines—the engine of "Constant Service"—the solution to your power troubles—the builder of profits.

We offer you in **Ideal Engines** that which every contractor wants—power and plenty of it, when it's needed.

Why not equip with Ideal Power now?

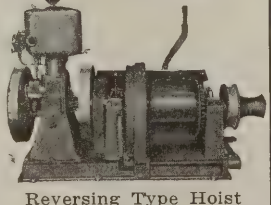
Our special booklet No. 516 will interest you.



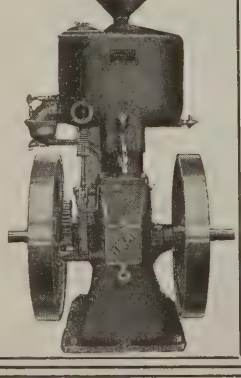
Trench or Mud Pumps



Small Hoist



Reversing Type Hoist



THE
IDEAL ENGINE CO.
R. E. OLDS, Chairman
Formerly
The Original Gas Engine Co.
East Kalamazoo Street
LANSING, MICH.

California Redwood Association

The California Redwood Association, 51-52 Newhall Building, San Francisco, Cal., has just been incorporated under the laws of California for the purpose among others of collecting and disseminating information and knowledge of the value and utility of Redwood timber and lumber and of the uses to which it is adapted. Most of the Redwood manufacturers have already joined the new association and have subscribed for its services. The officers are: President, Edward Selfridge, Jr.; vice-president, J. H. Holmes; secretary, A. B. Wastell. The business of the association will be carried on by several committees, the members of which will outline and direct its activities into the several channels of trade extesion, grading and inspection, traffic, etc.

The Story of the Stratton Level

A booklet describing in attractive style the story of the Stratton level has just been issued from the press by the Goodell-Pratt Company, Greenfield, Mass., and a copy, we understand, will be sent free to any address upon application. The descriptive text is illustrated in a way to prove attractive, and the information contained is such as to appeal to every practical mechanic who takes pride in his "kit" of tools. The booklet is only one of many dealing with the 1500 good tools made by the company.

TRADE NOTES

The "Medusa White House" booklet has just been issued from the press and copies are being distributed by the Sandusky Portland Cement Company, Engineers' Building, Cleveland, Ohio. The little work has been prepared in a way to appeal particularly to the home builder, but the information is also of a nature to interest the architect and contractor as well. The illustrations in the booklet are such as to afford the reader some idea of the artistic beauty of "Medusa White House," which it may be remarked in passing, is durable, fireproof and sanitary. A copy of the booklet can be secured by writing to the company.

Alpha Portland Cement Company with general offices at Easton, Pa., is offering to send free to builders and others having to do with the use of concrete, a copy of its "Red Envelope No. 17," which contains illustrations of distinctive concrete constructions, also a copy of its eighty-page book, "Alpha Cement—How to Use It." The company operates six mammoth plants on six trunk-line railroads, with a capacity of 25,000 barrels of Alpha cement daily.

Triple "A" Machine Company, 302 West Grand Avenue, Chicago, Ill., states that in order to meet the demand of contractors and builders who have only a limited amount of floor surfacing to do, it has designed two new models in addition to its old standard Triple "A" Spring-Driven Floor Smoother. The new models are known as Triple "A" No. 2 and Triple "A" No. 3. These machines have been specially priced so as to place them within the reach of everyone who needs a floor surfacing machine, and interested readers can obtain full particulars by addressing the company.

A. A. Jackson Machine Company, 1766 Broadway, Denver, Col., is sending out a free booklet entitled, "Money in Polished Floors," which contains much valuable information relating to its Jackson scraping, planing and sanding machine. The outfit embodies scraper, plane, cabinet finisher, sanding, polish and waxing device. The claim is made that a job or two are sufficient to pay for the machine.

The Ideal Engine Company, formerly known as the Original Gas Engine Company, East Kalamazoo Street, Lansing, Mich., is directing the notice of contracting-

(*Continued on page* 94)

We Won't Let a Lansing Mixer Go Wrong

What do you mean "won't"?

We mean that we cannot afford to let a single mixer leave our shops that hasn't been perfected and thoroughly tested.

You say there is not a perfect mixer?

You are correct.

There is not a perfect mixer manufactured; neither is there a perfect automobile, nor a perfect phonograph, nor a perfect typewriter. There never will be. We all strive toward perfection, but as close as we come to it is only as close as any article comes to perfection. If there is no absolutely perfect mixer, no manufacturer can truthfully tell you your mixer troubles are over when his mixer is purchased. There will probably be more or less mixer trouble so long as mixers are used.

But,—

with some mixers you will have less trouble than with others. There are certain degrees of perfection, even if there is no perfect thing. Some manufacturers can afford (at least they think they can), to sell a cheap mixer at a low price and consider the incident closed when the sale is made. Naturally they never sell the same man twice. Mixer troubles to them are the other fellow's miseries. Not so with the Lansing Company. We will be selling mixers a year from today, five years from today, twenty years from today, and we expect to sell you, too.

The few troubles our customers have with Lansing mixers—and they are indeed few—are our troubles. We make them our troubles.

The difference in price between a Lansing guaranteed mixer and others, is slight if any. We have found the wise contractor profits from the other fellow's experiences, and the small difference in the initial cost eventually pays him interest on the complete investment.

That's the why of the Lansing.

That's the reason Lansing Mixers were used on the Sheepshead Bay Speedway; the New York Subway; the Henry Ford farms; as well as on hundreds of sidewalk jobs; small and large building jobs, etc., etc.

Made in 5, 7, 10, 12, 15 cu. ft. capacities.

Write Today for Complete Catalog No. 21M

WAREHOUSES

New York
288-289 West Street

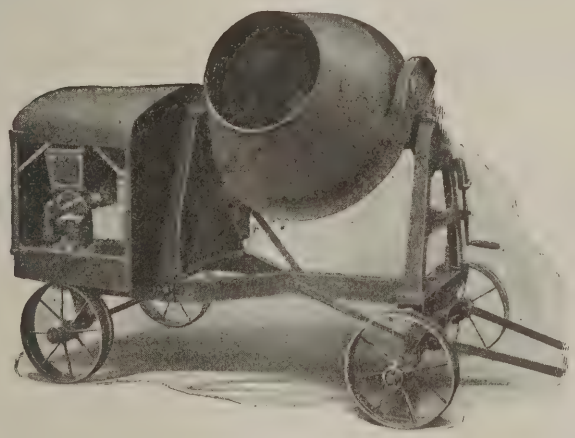
Minneapolis
517-519 North 3rd Street

San Francisco
338-348 Brannan Street

LANSING COMPANY
"KEEP YOUR PRODUCT ON WHEELS"
LANSING, MICHIGAN

WAREHOUSES

Boston
78 Cambridge Street,
Charlestown District
Philadelphia
Willow & No. American Sts.
Kansas City
1413-15 West 10th Street
Chicago
169 West Lake Street



A Moving Picture Film a Mile Long

would be made if we pasted together a letter of praise from our 5,290 well-satisfied users of

BIG-AN-LITTLE MIXERS

3 Sizes—14 Styles

A Little Mixer or a Big Mixer or the Happy Medium Big-an-Little combined.

An outfit for you to do your mixing of Concrete, Mortar or Plaster and equipped with hoist if desired.

Gold Medals at the Big Exposition. Get full information NOW.

The Yaeger Machine Co., 216 West Rich Street, Columbus, Ohio



"S. S. S." Low-Charging Concrete Mixer

The Low-Charging, Light-Weight, Compact Design of the "S.S.S." Mixer may enable you to complete your concrete work during freezing weather, as it can be placed inside the building or from floor to floor when doing concrete work in Winter.

The Mixer is charged direct by wheelbarrows from platform only 20 inches high, and the semi-automatic dumping device discharges the concrete in a few revolutions.

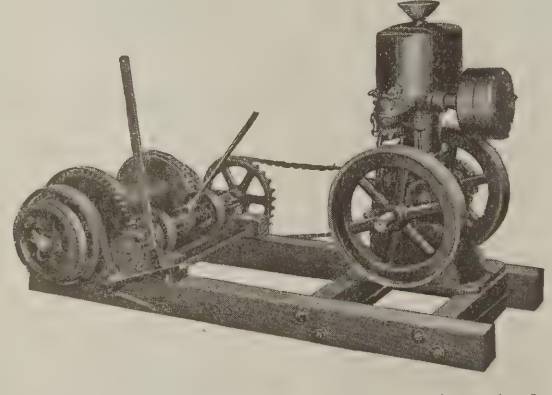
The "S.S.S." Mixer is built in four sizes having capacities of 4, 6, 9 and 11 cubic feet, with steel truck, gasoline engine, enclosed in steel house, complete.

Low Charging Saves One-Third

Complete Catalog No. 48-3 and Prices on Request.

"S.S.S." Reversible Hoist

With 4 H. P. Gasoline Engine



A low-priced outfit specially designed for operating double platform material elevators on small buildings, and can be readily adapted for direct hoisting with single line. Write for Booklet No. 48-3H for complete information on hoisting outfits, all styles and capacities.

See Our Exhibit at the Omaha Cement Show

The Standard Scale & Supply Co., Mfrs.

1345-47 Wabash Ave. Chicago — 1631 Liberty Ave. Pittsburgh — 145 Chambers St. New York

35 So. 4th St. Philadelphia — 1547 Columbus Road Cleveland

builders to the Ideal "Single Line" hoists which are built in two sizes of 4 and 6 hp. The capacity of the smaller size is 900 lb. and that of the larger size 1500 lb. The hoist is mounted upon a steel skid; has a 10-in. winding drum and an extra strong brake.

The February issue of DoorR-Ways, the house organ of the Richards-Wilcox Mfg. Company, Aurora, Ill., is unusually attractive both in its printing and in the matter contained within its covers. A number of the company's specialties are referred to in a way to attract the attention of the carpenter and the builder, not to mention the hardwareman who carries on hand a stock of the company's hangers and other specialties. Accompanying the issue is an illustrated folder describing the R-W Stewart electric door opener and closer, an attachment which it is claimed will save time and money in any building where the doors must be opened and closed a number of times a day.

J. A. & W. Bird & Co., 88 Pearl Street, Boston, Mass., makes announcement of the fact that it has changed the location of its New York City offices from 66 Beaver Street to the new Equitable Building, 120 Broadway, where the company has much more commodious quarters as well as better facilities for meeting the requirements of its trade. The company also states that it has not advanced the price of "Ripolin" enamel paint, as its stock is sufficiently large to take care of practically all demands. In view of the fact that "Ripolin" is made in Holland, the company is experiencing no difficulty in obtaining the material of the same high standard as heretofore.

Lehigh Portland Cement Company makes announcement from its Chicago office that owing to its rapidly increasing business in the Northwest, and in order to give customers prompt and efficient service, it has established a sales office at Mason City, Iowa, under the supervision of J. H. Black as district sales manager. The company will still retain its office in the Security Building, Minneapolis, Minn., which will be under the supervision of J. J. Kehoe.

F. E. Myer & Bro., Ashland, Ohio, have been distributing a poster of mammoth proportions carrying a vast array of illustrations of specialties turned out by them, the goods embracing spray pumps and fittings, wind mill force pumps and hay unloading tools. The leaflets containing the calendar proper are attached to the center of the poster, the upper part of which gives an extensive birdseye view of the company's plant.

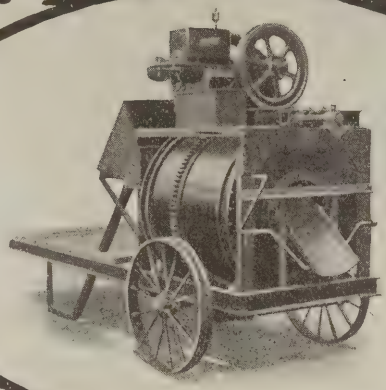
A package of illustrated circulars sent out by P. & F. Corbin, New Britain, Conn., relates to some features of the extensive lines of builders' hardware which they turn out. Reference is made to the pin tumbler cylinder locks with ball bearings, to door handles of hammered finish, to Corbin door checks and to various designs of Corbin cast-bronze hardware which is described as strikingly original in its form and elegant in effect.

Paul O. Moratz, Bloomington, Ill., is sending out a neat folder calling attention to the "Acme" brand of ⅜-in. oak flooring. Emphasis is laid upon the great improvement made in the manufacture of thin oak flooring and to the fact that the bevel tongue and groove of the "Acme" will not only withstand rough handling, but will save the carpenter a large amount of hard work, because it comes together tight and even without driving. Another claim made is that owing to the very strong lip this thin flooring will withstand the weight and moving of heavy furniture the same as thick flooring. Among the information given in the folder are directions how to figure the amount of oak floor required to cover a certain space, also standard weights of ⅜-in. oak flooring, together with an enumeration of the grades in which the "Acme" brand is made.

Fritz Foltz, head of the firm of F. Foltz & Son, architects, died Feb. 1, 1916. Mr. Foltz has been active in practice of architecture in Chicago since 1868. The

(*Continued on page 96*)

The ARCHER



50 Cubic Yards and More of Concrete Per Day!

Can you do better than that by the old hoe-and-box method? Can you mix more than 50 cubic yards of really **good** concrete in a day?

It is possible—yes—but not probable; and, surely, not profitable.

An Archer Mixer can be managed by one man. It saves the wages of five men toiling at a mixing box!

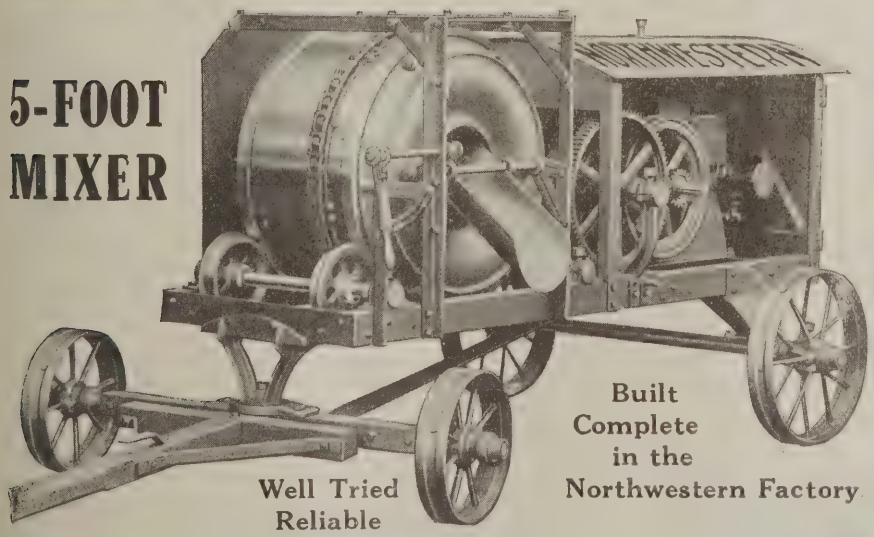
Chew this over in your mind, after which let us come to terms.

Established 1891

ARCHER IRON WORKS, 2440 West 34th Place, Chicago, Ill.

"NORTHWESTERN"

5-FOOT MIXER



Well Tried Reliable

Built Complete in the Northwestern Factory

This mixer is built right—therefore it works right. A 3 H. P. hopper cooled engine, standard wheelbarrow hopper, steel housing and team pole with truck of standard wagon gauge. Weight 2400 lbs. Also made in 10 ft. capacity.

NOVO ENGINE furnished at small extra cost, if desired.

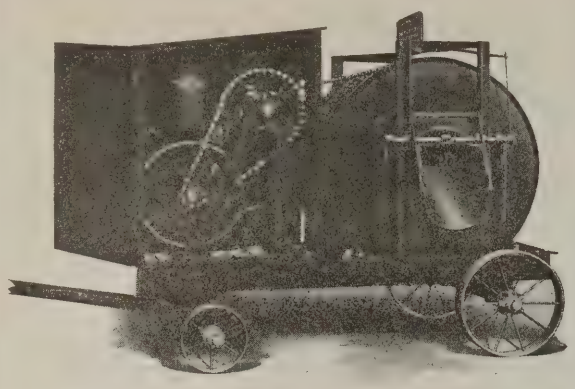
Send for our FREE Book No. 6 on concrete mixing; also details of our EASY PAYMENT PLAN.

Satisfaction Guaranteed

NORTHWESTERN STEEL AND IRON WORKS

EAU CLAIRE, WIS. CAPITAL, $200,000.00

$185



Ideal Cincinnatus Batch Mixers

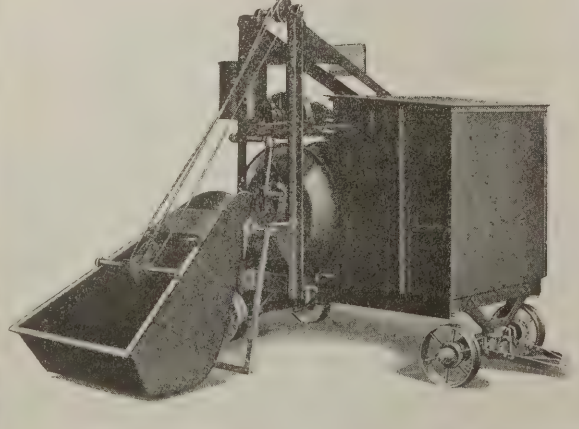
Tried, Tested, Approved, Accepted.
It pays to use a Mixer that is dependable, one that will turn out good concrete and lots of it. The ability of Cincinnatus Mixers to mix quickly and thoroughly means profits on every job.

Built in four sizes—5, 7, 10 and 14 cu. ft. capacities (loose materials). Equipped with Wheelbarrow and Batch Hoppers, Power Side Loader or as Rear Discharge Traction Pavers.

Mixer values are measured by results. Ideal Cincinnatus Mixers give the best results.

Prices, $197.50 and up.

Ideal Concrete Machinery Co.
1310 Monmouth Avenue
Windsor, Ont., Can. Cincinnati, O.



business will be conducted as usual at 1760 Conway Building, with F. C. Foltz as the head.

The year book of the School of Applied Art of Battle Creek, Mich., contains in attractive shape much interesting information relative to this institution. The opportunities offered by the school are presented in forceful style and the point is made that its "original direct-dictation system of correspondence instruction brings the guidance of eminent artists" to the student in his own home. The school has been teaching successfully for sixteen years and stands to-day high in the art world.

Some interesting literature relating to the "Incinerite," which it is claimed will solve the garbage problem for people living in apartment houses, is being distributed by E. C. Stearns & Co., 400 Oneida Street, Syracuse, N. Y. The device is constructed in a very substantial manner of heavy castings, brass and sheet steel lined with asbestos and is said to be practically indestructible. The gas burner system and the formation of the grates are such that no matter how firmly the garbage may be packed in the Incinerite, the gas combustion will not be adversely affected.

We learn from the Willis Mfg. Company, Galesburg, Ill., that during the past year it has placed 1000 of its skylights in various parts of the country and that they are meeting with increasing popularity. The skylights are made with the best grade of sheet metal, strongly reinforced, and the company guarantees them not to sag. An important feature in connection with them is that no putty is required and that no tools except a hammer and a screwdriver are needed to install the skylights. In fact any carpenter can readily put them in place. Different sizes and styles are made, and in addition to the company's well-known ventilators, it also has a complete line of sheet metal building materials. A catalog which describes the company's products has been issued and can be secured on application.

S. Cheney & Son, Manlius, N. Y., are directing the attention of architects to what is known as the Zimmerman patent iron base for wood porch columns, the claim being made that the use of this base tends to prevent rotting of the columns. It is adapted for both round and square work, and a folder sent out by the concern gives directions for applying the base, also prices and other interesting information.

At the recent meeting of the stockholders of the Detroit Steel Products Company, makers of Fenestra solid steel windows, Detroit, Mich., Walter S. Russel was elected president, R. S. Drummond vice-president and J. G. Rumney secretary-treasurer and general manager.

Typewriters Distributing Syndicate, 1510-59-P Wabash Avenue, Chicago, Ill., calls attention to the fact that for the first time in history building contractors and lumbermen can obtain a standard visible typewriter with keyboard designed especially for the needs of their business, and at a price so low that it is quoted only in a confidential letter.

The Oak Flooring Bureau, 1349 Conway Building, Chicago, Ill., is distributing a circular letter giving the substance of its reply to a prominent architect of St. Louis who asked for information as to the grade and thickness of oak flooring it would recommend for a class of moderate cost residences that he is planning for investment. The bureau also inclosed a copy of its "Oak Flooring Booklet" and 1916 calendar as likely to prove of interest to him in the connection named. Copies can be obtained by any interested reader on application.

Lansing-Company, Lansing, Mich., is now making new contracts covering its concrete mixers and other specialties for 1916, and is offering the agency to reliable contractors in unoccupied territory. Those builders and dealers in contractors' equipment who may be interested in a matter of this kind should communicate with the company at once.



The Building Age

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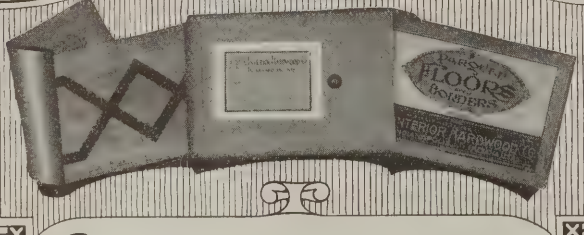
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The Building Age

NEW YORK, APRIL, 1916

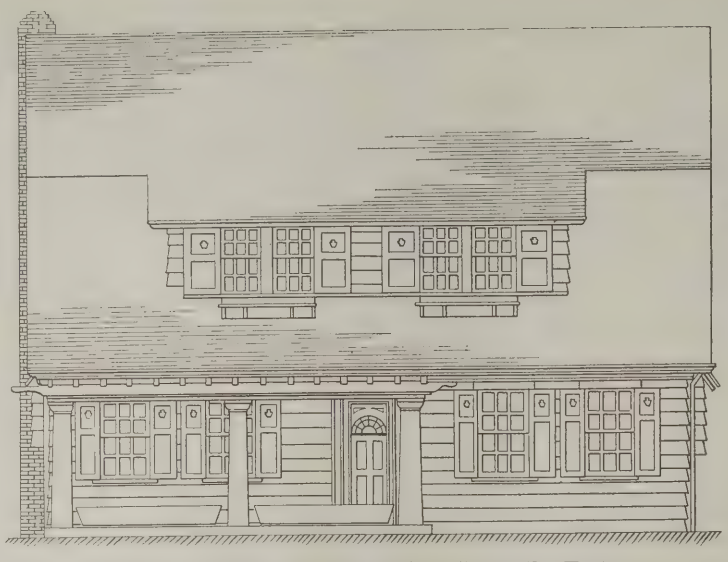
A Cleverly Planned Syracuse Dwelling

Silver Gray Clapboards Contrast with Dark Green Shingle Roof—Outside Walls and Ceilings Insulated

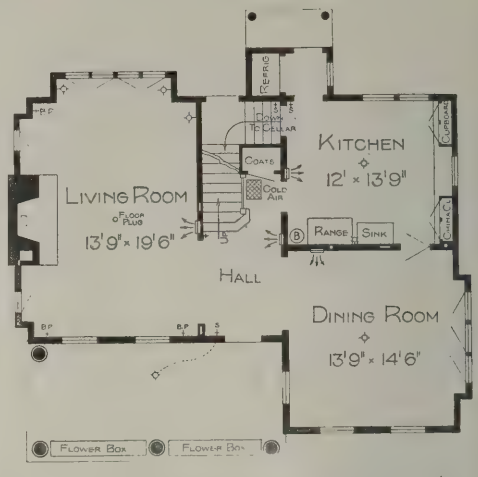
IT may be said that the architect who is truly clever in his profession is he who so develops his work as to create a harmonious whole well adapted to the purposes for which it is intended, as well as thoroughly in keeping with its immediate environment. Primarily, of course, he must make it conform to the requirements of his patron, meeting therein individual tastes and preferences, more especially so perhaps if the work has to do with housing accommodations. As individual tastes differ so must the designs of our homes vary greatly in their external treatment as well as in their interior arrangement. In this connection the clever example of domestic architecture here illustrated will be found of interest. It is the conception of an architect whose desire has always been to design houses somewhat different at least from the average, while at the same time keeping well within



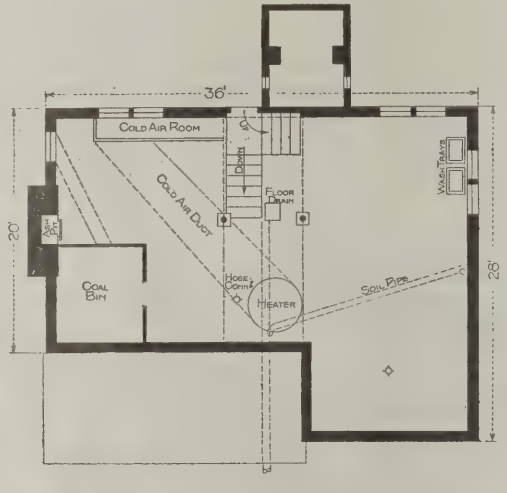
View in the Living Room of the House Looking from the Hall Toward the Extension Window



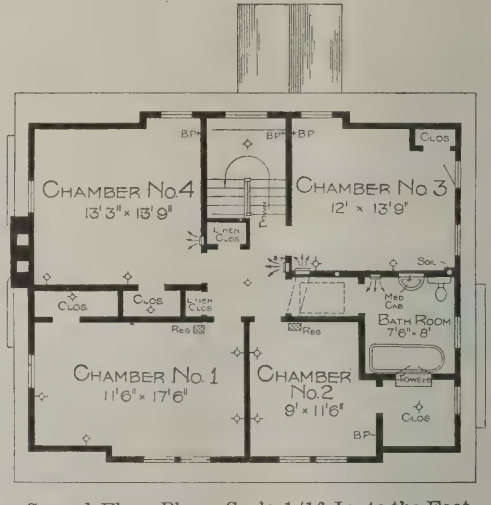
Front or West Elevation—Scale 3/32 In. to the Foot



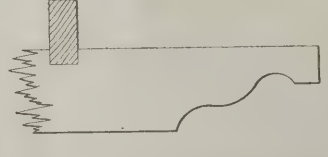
Main Floor Plan—Scale 1/16 In. to the Foot



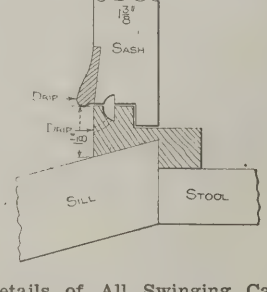
Foundation Plan—Scale 1/16 In. to the Foot



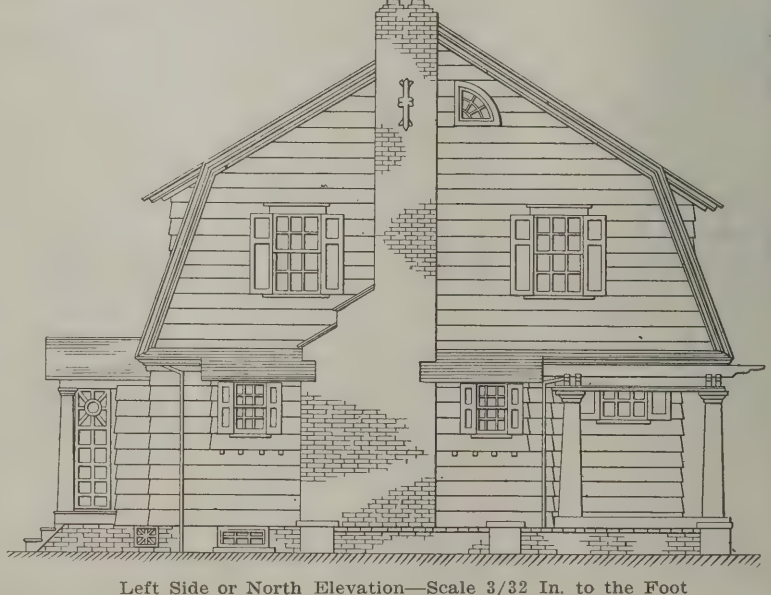
Second Floor Plan—Scale 1/16 In. to the Foot



Detail of Ends of Beams Over Front Porch



Details of All Swinging Casement Windows—Scale 3 In. to the Foot



Left Side or North Elevation—Scale 3/32 In. to the Foot

A Cleverly Planned Syracuse Dwelling—Plans, Elevations and Construction Details

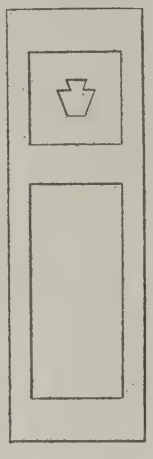


An Idea of the Kitchen Equipment as Viewed from the Hall Door—The Corner of the Range is Seen at the Extreme Right

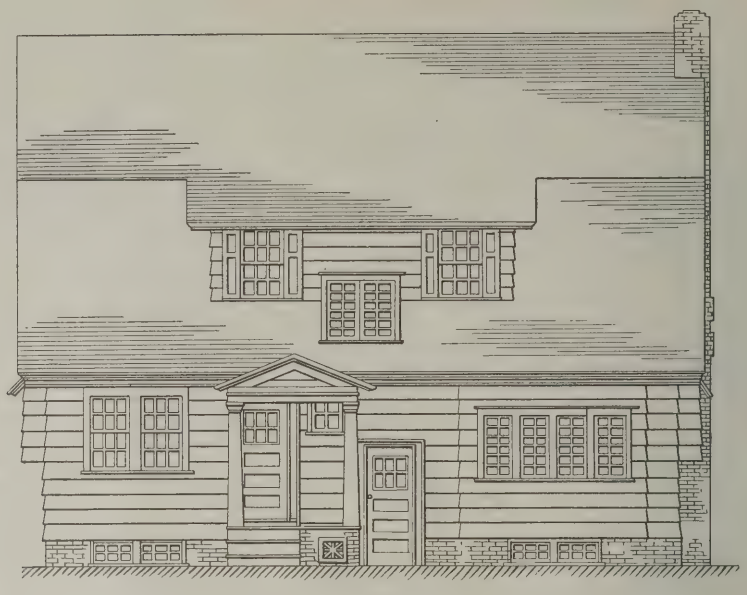
limitations as to cost. What he has produced in the present instances invites the careful consideration of the home builder by reason of the many refinements which the design embodies and which go so far toward rendering comfortable and convenient the modern home.



A Cleverly Planned Syracuse Dwelling—The Dining Room—Architect, H. L. Conde



Detail of Blinds—Scale ½ In. to the Foot



The Rear or East Elevation of the House—Scale 3/32 In. to the Foot

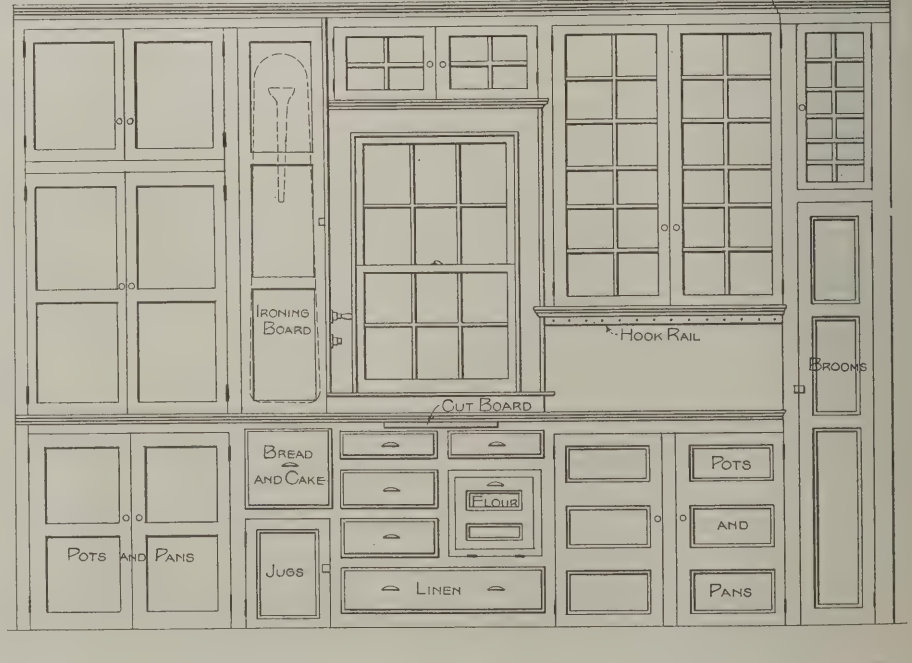


The Right or South Side of the House Showing the Triple Window Over the Sideboard in the Dining Room; also the Window Effect in the Second Story

Scale 3/32 In. to the Foot

Details of the Cabinet in the Kitchen Showing Recess for Ironing Board and Compartments for Various Articles of Culinary Equipment

Scale ⅜ In. to the Foot



A Cleverly Planned Syracuse Dwelling—Elevation and Miscellaneous Constructive Details



A Cleverly Planned Syracuse Dwelling—The Main Hall Looking Toward the Stairs

In describing the local conditions influencing in some measure the design in question, the architect states that the site was sloping ground with a small knoll, the top of which was just about the center of where the house now stands. The lot sloped down on all sides, and the architect therefore fitted the house to the land, rather than graded the land to fit the house as is done in the great majority of cases. This treatment retained the natural and beautiful contour of the land, made the house to appear lower, gave better drainage and saved a large portion of the cost of grading, besides creating a far more pleasing aspect to the eye than the straight, leveled-off surroundings of many houses. The brick walk and driveway curves up from the street instead of being straight, and in this respect is a variation from the conventional approach to the average dwelling.

The color scheme of the exterior is such as to produce a pleasing combination. The wide cypress clapboards are stained a silver gray, allowing the grain to show through, while all the trim is white, forming a striking contrast with the dark green shingles of the roof. Red Pennsylvania face brick were used in the chimney as well as in the foundation above grade and porch. The brick were laid in "Dutch bond" with half-inch "rough cut flush" pure white mortar joints. All exterior hardware is finished in dull black with special old-fashioned strap hinges and bolts.

All overhanging windows, and wherever the second story overhangs the first, are filled between joists with 4 in. of concrete. All outside walls and second floor ceilings are filled between the studs and joist with hair-insulated-quilt, making a tight double air space, thus insuring a cool house in summer and a warm one in winter.

The floor joists are of 2 x 10 in. hemlock, the studs of 2 x 4 in. pine and the rafters 2 x 8 in. The cypress clapboards are 10 in. in width and the columns are of cypress made by the Hartmann-Sanders Company. All doors are 1¾ in. thick.

The floors are double with deadening felt and waterproof paper between. All are of ⅞ in. birch, except the living room, which is of oak, finished with two coats of shellac and then waxed. All inside painted work is five-coat work.

The floors of the bath room and the space occupied by the refrigerator are of sanitary flooring with 9 in. base, all in one piece. The walls are wainscoted with tile.

The main bath room has a built-in tub, a pedestal lavatory, china tank, horseshoe seat closet, medicine cabinet and a large towel cabinet.

The living room is finished in dark oak with rough sand float finish plaster between the beams and pilasters. An unusual feature of this room is the setting out of the windows to give the effect of the old-fashioned rooms that really had thick, massive walls. The mantel in the living room is of special design made of Caen stone cement.

The dining room is finished in yellow ivory with solid old-blue paper in the panels, rough plaster ceiling and around the panels tinted yellow ivory. The furniture and draperies are such as to match.

The kitchen walls, ceiling, woodwork and lighting fixtures are white enameled. The ironing board, which swings into a recess provided for it in the wall, is hinged and also has a hinged leg. The board swings down into position for use. An electric ironing plug with pilot light is conveniently placed.



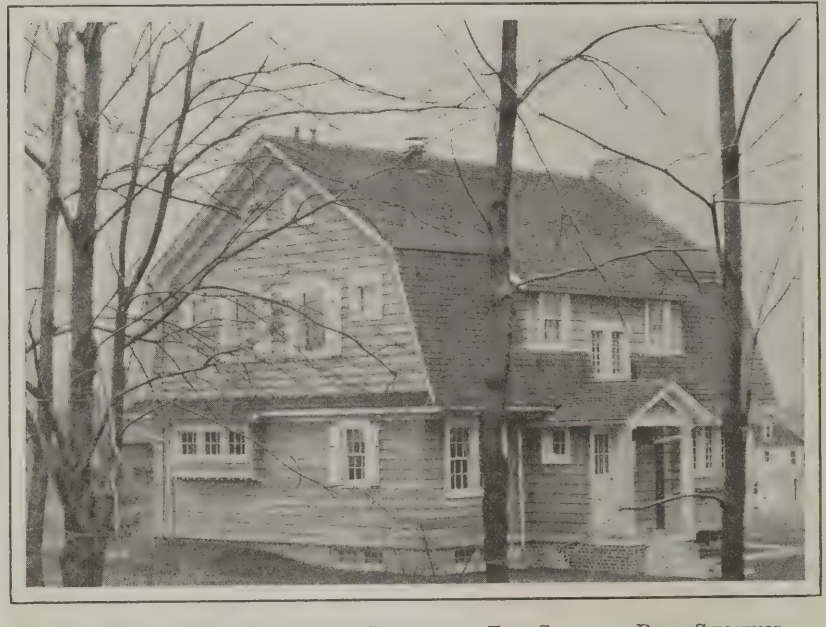
A Front View of the House Showing Driveway Leading to the Garage

There is a broom closet at the right, a sliding bread board, sliding shelves and pan racks on all lower doors in the kitchen equipment. In fact, every convenience is provided to save steps and labor.

An interesting feature of the main floor arrangement is the door of the coat closet just at the right of the flight of stairs leading to the second story. This is a plain mirror door into which is fitted a French door grill, and the reflection gives the impression of another room beyond. The grill is hinged separately, thus giving an unobstructed use of the mirror when open. An idea of the effect produced may be gathered from the picture on page 23, showing a view of the staircase hall.

All woodwork of the second floor is finished in yellow ivory with the rough sand finish walls tinted, yellow ivory ceilings and dull yellow ivory fixtures.

An inspection of the floor plans shows three principal rooms on the first floor, the living room extending the entire depth of the house. The dining room and the kitchen are at the right of the hall with direct communication between, and the kitchen may be reached both from a rear porch and also from the door at grade which also leads to the cellar. On the second floor are four sleeping rooms and bath room, all compactly arranged so that there is practically not a foot of waste space. The stairs are amply lighted by the window on the broad platform half way up the main flight. In the attic is a maid's room and a bath room fitted with modern plumbing fixtures.



A Cleverly Planned Syracuse Dwelling—The Side and Rear Showing Multiplicity of Windows and Portico Entrance

The house is equipped with a Kelsey No. 24 generator complete with humidifier, thermostat and outdoor cold air intake running under the cellar floor. A complete ventilating system connects each room with the ventilator in the roof.

Another interesting feature of the house, and one which will readily be appreciated, is a sill cock on one side which furnishes cold water for sprinkling, while on the porch side it furnishes hot water for cleaning porches, windows, etc.

The driveway shown at the left of the house leads to a garage in the rear of sufficient size to contain two cars. A description will appear in a later issue.

The house here shown was erected by day labor in accordance with drawings prepared by H. L. Condé, No. 22, The Hartson, Syracuse, N. Y., who also hired the men and supervised the construction. Nothing was done by contract except the plumbing and heating.

Apple wood is the favorite material for saw handles, and some goes into so-called brier pipes.

Concrete Silos in Missouri

Some very interesting information as to the use and construction of silos is being furnished by the Missouri Experiment Station through the medium of its Bulletin, and the many facts which have been gathered by this authority are valuable to the building-contractor who may be called upon to construct silos of concrete. Reports made by 300 Missouri farmers who have silos shed much light on the subject of silo efficiency, under their farm conditions at least. Of the 300 farmers reporting 234 had silos of wooden stave construction, thirty-three of solid concrete, and twelve of concrete blocks.

Out of 100 men having some difficulty with the stave silo, thirty-eight expressed a preference for the solid concrete silo in case they should build another. Not a man, however, having a concrete silo expressed a desire for any other kind in the event that he should build again.

The average per cent of spoiled silage in silos of different kinds, as reported by correspondents of the Experiment Station, was greater in the stave silos, the average being 3 per cent, while the average per cent of loss in the concrete and the concrete block was 2 per cent.

It is pointed out, however, that the percentage of spoiled silage is not great enough in any of the silos to be made a talking point for or against any particular kind.

As regards relative costs of the different kinds, the solid concrete and the concrete block silo involve a greater expenditure than the others, but the sizes of the solid concrete and the concrete block silos, considered in the Bulletin, are appreciably greater than those of the others. The average of the concrete silo was 15.4 ft. diameter and 35.1 ft. in height, while the average of the concrete block silos was 16.3 ft. diameter and 34.1 ft. in height. On the other hand, the average of the stave silos was 15.1 ft. diameter and 30.9 ft. in height. The cost per ton shows that the monolithic silo is actually cheaper than the wooden stave silo, and that the apparently expensive block silo still costs 1 per cent per ton less than the stave. These favorable figures, however, are partially offset by the fact that the average concrete silo was larger and taller than the wooden silo, and it is well known that the greater the capacity of the silo the lower the ton cost.

Canada has 23,000,000 acres in timber reserves, as compared with 187,000,000 acres in the national forests of the United States.

"Points" for Apprentice Bricklayers

"Speed," One of the Main Assets, is Attained by Eliminating All Unnecessary Movements—Face Bonds

By W. H. Hefelfinger

IT is generally conceded by the majority of people that there is something radically wrong with our present system of teaching young men a trade, but as yet no one has succeeded in solving the problem for all men. Trade schools, continuation schools, part-time schools and vocational work in the public schools, have solved it for a large number, but there are still thousands of apprentices and mechanics who are not getting their trade as thoroughly as they would like or as they should.

Most young men learning a trade as apprentices do not as a rule get the right attitude toward those people who are in a position to help them most. I do not mean just those people who are highly

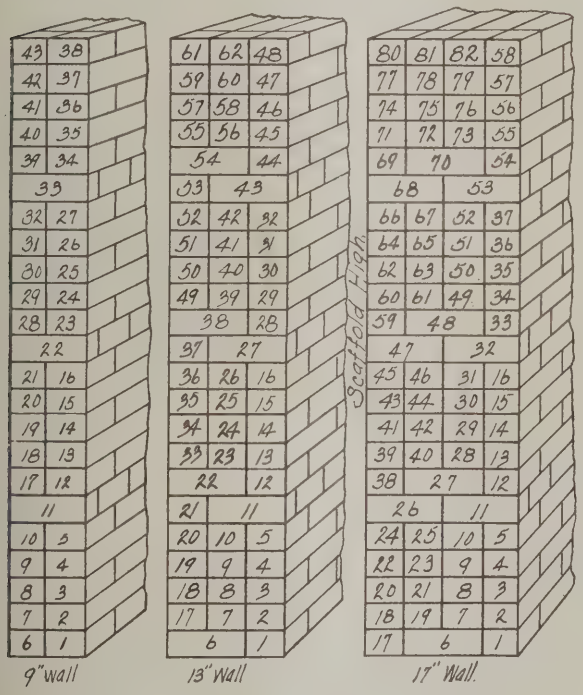


Fig. 1—Section of Walls of Different Thickness, Showing Order in Which Courses Should be Laid

skilled in both the practical and technical points of their trade, but educators and that class of people who have made a study of industrial conditions with a view to bettering labor conditions and mankind in general.

The mechanic, as a rule, is too narrow in his views concerning the things he thinks are of benefit to him. It has been my experience that the majority of young mechanics are woefully lacking in the things not pertaining directly to the trade but very necessary for a complete mastery of it. Now it is not from the older mechanic working alongside that you can get these things, but from engineers, educators and men who make industrial conditions a life study. I believe when you once get a boy to realize the true value of mathematics, drawing, the science pertaining to his particular trade and numerous other things incidental to the trade, you have the battle half won. The hard part seems to be to get mechanics, boys especially, to realize the value of these things.

The fact that the average mechanic has very little use for the technical man is mainly because he fails to understand the technical man's line of reasoning. The engineer thinks in technical figures and terms, which are very vague to the ordinary mechanic. This is one reason why it takes a man with some technical education and lots of practical experience to get the mechanic to put the engineer's ideas into practice. You will find, as a rule, mechanics think more of the foreman's ability than they do of the engineer's, probably due to the fact



Fig. 2—Elevation of Wall Laid in What Is Known as American Bond

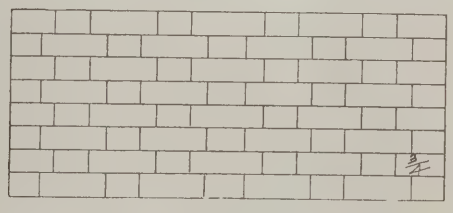


Fig. 3—Elevation of a Wall Laid in Flemish Bond

"Points" for Apprentice Bricklayers—Bonds and Wall Construction

that they see more direct evidence of the foreman's knowledge.

The young mechanic should read all the reliable magazines and technical works to which he can get access, as they contain much information which will give him a clearer understanding of why he should do certain things and why not do others. Very few reasons are given on the job. You are told to do so and so, and are expected to do it; no one has time for extensive explanations. You may also gain valuable information from conversations with engineers and technical men. Don't fail to be on friendly terms with them. I have found them more ready

to give information than the mechanic working alongside of you.

The purpose of this article is to try to give the apprentice and mechanic some information pertaining to the bricklaying trade that I have learned by personal contact with engineers, from technical works, and from practical experience laying brick. My business is to teach young men to earn their livelihood as bricklayers, and in the eight years I have been following this vocation, I have noticed that nearly all boys have trouble in acquiring certain things, which I shall endeavor to explain.

One of the main assets of a bricklayer or any mechanic is speed, and all apprentices should pay particular attention to it. The first step toward attaining speed is to eliminate all unnecessary movements. The engineer calls this "efficiency of effort." Do not make any more trips to the mortar board for mortar than necessary, by which I mean if you can learn to spread as many bricks with three

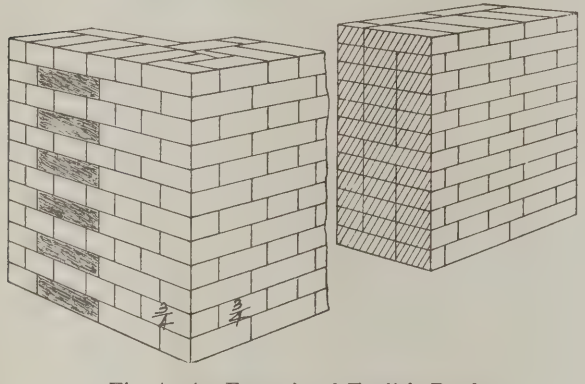


Fig. 4—An Example of English Bond

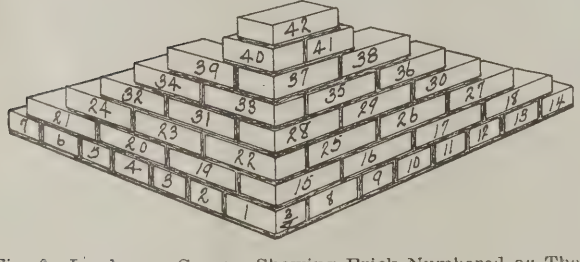


Fig. 6—Lead on a Corner, Showing Brick Numbered as They Should be Laid

one time. These little things all save a fraction of time, which amounts to hours in a day and usually is the difference between the average bricklayer and the fast one.

In regard to speed, my advice is to watch the fastest man on the job; follow his movements as closely as possible and at the same time try to improve on them. Constant practice with consistent effort is bound to produce results; but remember, don't sacrifice good work to obtain speed, and, above all, as an apprentice, don't think about how many brick you are laying for the boss, but try to realize that increasing the number of brick you lay from day to day increases your ability and makes you a more valuable bricklayer.

Very few bricklayers are thoroughly familiar with the different kinds of face bonds, and especially in starting them on the corner. I have made a few sketches of the most important ones. Fig. 2 illustrates American bond with solid headers every sixth course. This is also built with a Flemish header, which is a header and stretcher. Fig. 3 illustrates Flemish bond. Fig. 4 illustrates English bond, showing how the corner is built and how it is bonded with the rest of the wall in this country.

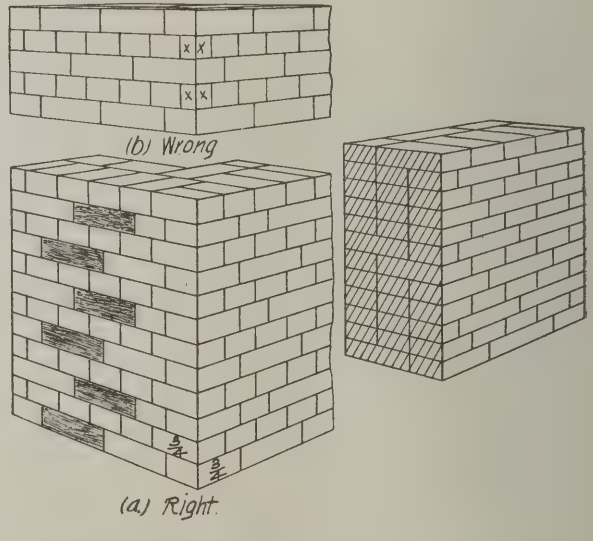


Fig. 5—Brick Work Laid in Dutch Bond

"Points" for Apprentice Bricklayers—Examples of Walls Laid in Different Bonds

trowelfuls of mortar as another fellow does with four, you will certainly do it easier and more quickly. It does not take much more effort to learn to spread four bricks at a time than it does three. Always keep your mortar well tempered and rounded up on your mortar board. It pays in the end. Learn to pile your brick on the wall in the quickest way as easily as you can. Keep all brick spalls and mortar out from under your feet, especially on a scaffold. Learn the order in which walls of different thicknesses should be laid up. You will find this order in Fig. 1, which represents cross sections of a 9 in., a 13 in. and a 17 in. wall having the courses numbered as they should be laid. In case you have a number of pieces to lay against a joint or frame, mark a number at one time, then cut them. You will find this considerably quicker, and your work will look better than if you lay each piece as you cut it. The same holds true when laying an arch requiring cut brick; cut them all at

Fig. 5 shows Dutch bond, how it should be built at the corner and how bonded to the rest of the wall. Notice particularly that each corner brick is a three-quarter. Do not lay up with a 2 in. piece on the corner, as is shown at "b" in Fig. 5, because it is poor construction, besides being harder to lay. You will notice I have shaded some of the stretchers in Figs. 4 and 5 to draw your attention to the differences between English and Dutch bond.

If you will compare these figures you will notice they are all five courses between headers. The number of stretcher courses between headers is usually determined by the building laws of a city. I have built 9 in. walls with eight and nine courses, although five are better, but the idea I want to convey is that you will still have American bond if you use more than five courses between headers. In the other bonds you cannot change the number of stretcher courses between headers and still have English or Dutch bond, but you do not necessarily

have to make every third course of headers of whole brick. Making them all whole brick or all bats does not change the face, and you still have English and Dutch bond.

Fig. 6 illustrates a lead on a corner having the brick numbered as they should be laid. I have a certain order for building a corner that I think produces efficient results. Rotation is for first lead on foundation; other leads are same except you eliminate No. 4 and strike each course as you lay it.

1. Lay first course to line from corner to corner.
2. Strike up these joints.
3. Lay three more courses.
4. Plumb up.
5. Strike up.
6. Lay rest of corner striking each course as you lay it.
7. Plumb.

In building a lead, try to lay the brick as level as possible. Learn to tell whether a brick is level by just looking down on it. Take special care that the first brick on the corner is not laid too tight or you will have trouble when you come to lay the rest of the wall.

A Frame Cottage at Pensacola, Fla.

Interesting Example of Southern Home Costing Less Than $4000—Roof of Asphalt Shingles

THE story and a half cottage is a type of dwelling popular the world over, and in the different volumes of this journal we have presented from time to time designs of this nature representing the conception of architects operating in various sections of the country. It is our privilege at this time to show an attractive cottage design recently executed in the south, and which is a fair example of this type of dwelling in a climate requiring little, if any, artificial heat outside of open-grate fires to render the house comfortable.



General View of the Finished Building—W. C. Frederic, Architect

An inspection of the halftone picture upon this page will afford the reader an idea of the appearance of the finished structure, while the floor plan shows the general layout of the interior.

The foundation walls as well as the porch enclosure and supports are of field stone while the exterior frame is covered with rough clapboards stained a chocolate brown, with the trim finished ivory white. The outside 2 x 4 in. studs are not covered with sheathing boards as in the colder climates, but heavy building paper is tacked to the studs and then covered with the weather boards as stated, and exposed 6 in. to the weather.

The roof is of the usual construction and covered with Vulcanite asphalt shingles, the two chimneys being of brick. The floors are double, the finish floor being of "B" grade selected pine laid in strips with 2½ in. face.

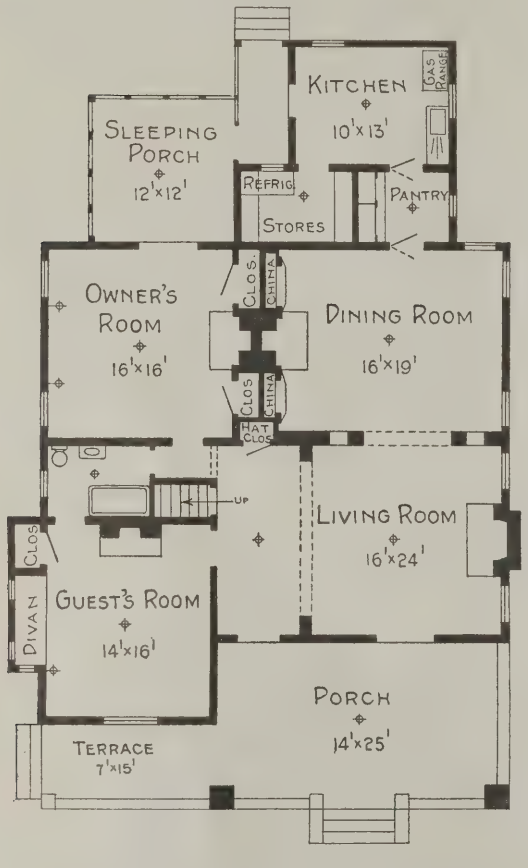
The walls and ceilings of the rooms are plastered two-coat work and the walls tinted. The interior trim is finished a Mission brown.

The house here shown was erected in Pensacola, Fla., and as the climate is very mild in that section, the most important thing for the owner to consider in connection with the construction work is a water-tight roof. The architect states that it is not at all uncommon to have 60 in. of rainfall in the course of a year and this very often with the wind blowing a gale of fifty miles an hour. The

more pretentious houses have a small cellar for the reception of the heating plant, but this is not the case with those of moderate cost.

Even with the finest houses in the south there is no laundry or servants' rooms in the dwelling proper, but the servants' quarters are built in connection with the garage in a separate structure.

An inspection of the accompanying floor plan shows a living room, dining room, kitchen, two sleeping rooms and bath room compactly arranged with a sleeping porch at the rear. Communication between the dining room and kitchen is through a conveniently arranged pantry, while the refrigerator is so placed as to be iced from the outside through a door just at the left of the window which gives light to the storeroom.



Main Floor Plan—Scale 1/16 In. to the Foot

The cottage with neat fixtures, plumbing, etc., cost $3,898.50 and was designed by architect W. C. Frederic, Thiesen Building, Pensacola, Fla.

Building in Philadelphia

The new year is opening up with bright prospects for operative builders, and notwithstanding the increased cost of all materials entering into construction work, as well as the greater cost of labor in the building trades, the opinion prevails that 1916 is likely to establish a new record in building operations in Philadelphia. It is expected that the greater portion of dwelling house construction will be done along the Northeast Boulevard, where sites for 3000 to 4000 homes have recently been sold. Much house building will also be done in West Philadelphia, where the outlook is most encouraging.

Meeting of National Builders' Supply Association

The seventeenth annual convention of the National Builders' Supply Association was held at the Statler Hotel, Cleveland, Ohio, Feb. 17 and 18, when more than 300 delegates were in attendance. Many important matters, particularly those affecting relations between dealers and manufacturers, were discussed at length. Among other things a resolution was adopted authorizing the president to appoint a committee of three to act as an Arbitration Board in connection with the efforts of members to bring about more uniform conditions in the marketing of cement. That committee is composed of E. K. McCormack and W. B. Stewart of Chicago, and W. A. Fay of Cleveland.

Officers for the ensuing year were elected as follows:

President, James H. Allen, Lincoln, Neb.
Treasurer, John J. Voelkel, New Orleans, La.
Secretary, L. F. Desmond, 1211 Chamber of Commerce Building, Chicago, Ill.

In addition to the above officers there were thirty-one vice-presidents elected representing as many different cities of the country; also nine directors.

Los Angeles Architectural Exhibit

The Southern California Chapter of the American Institute of Architects held a most successful architectural exhibition at the Metropolitan Building, Los Angeles, Cal., from Feb. 15 to Mar. 4. After the opening night, for which five thousand invitations were issued, the show was open to the public, and there was a good attendance throughout the period. The exhibition was the most complete and finest display of architectural drawings, mural decorations, etc., ever shown in southern California. The show was held in a part of the hall that houses a permanent exhibit of building materials, which also received considerable attention.



End of Dining Room Looking Toward the Open Fireplace—Scale 3/16 In. to the Foot

A Frame Cottage at Pensacola, Fla.

Hanging Glass Doors

In the comments of "Contractor" on page 49 of the March issue the sentence next to the last should read "If rain will strike it, place that side out which is most impervious to rain."



View Looking Toward the Dining Room and Café End at the Right of Which Are the Men's Lockers

New Home of an Eastern Country Club

A Dignified Structure in Stucco and Half-Timber Effect Embodying Many Interesting Features of Construction

WITH the present policy of outdoor sports and especially of golf, tennis, polo, etc., nearly every community has its country club with a home on the field representing a studied conception of what is required in the way of a building of this nature. The interior arrangement is of unusual interest owing to the diversified purposes for which it is called upon to provide, and in the example forming the basis of the present article the architect and the builder will find much to



The Office and Reception Room End of the Club House with Porte Cochere at the Extreme Left

command their attention. In the exterior treatment the designing architects have cleverly carried out the English half timber effect while the location of the building itself upon a commanding eminence with the foreground sloping gently toward the tennis courts, materially contributes to the impressiveness of the design.

The foundation and retaining walls are of native stone laid up in mortar composed of one part Portland cement, three parts coarse sand and 10 per cent lime putty. These rest on footings of concrete composed of one part Portland cement, two parts coarse sand and four parts broken stone of sizes to pass through meshes ranging from a half inch to 2½ in. All exposed walls, piers and chimney breast are of field stone laid up in the same kind of mortar as that used for the foundation walls.

The frame of the superstructure is of spruce with girders having 2 x3 in. bearing pieces spiked to the sides. The wall and partition studs are 2 x 4 in., placed 16 in. on centers and doubled at all openings. The corner posts are braced both ways at sill and plate. Where bearing partitions occur over each other the cap of the lower partition forms the sill of the one above. Fire stops are cut in between the joists at the sills on all floors and partitions between stair stringers in accordance with the Ordinances of the city.

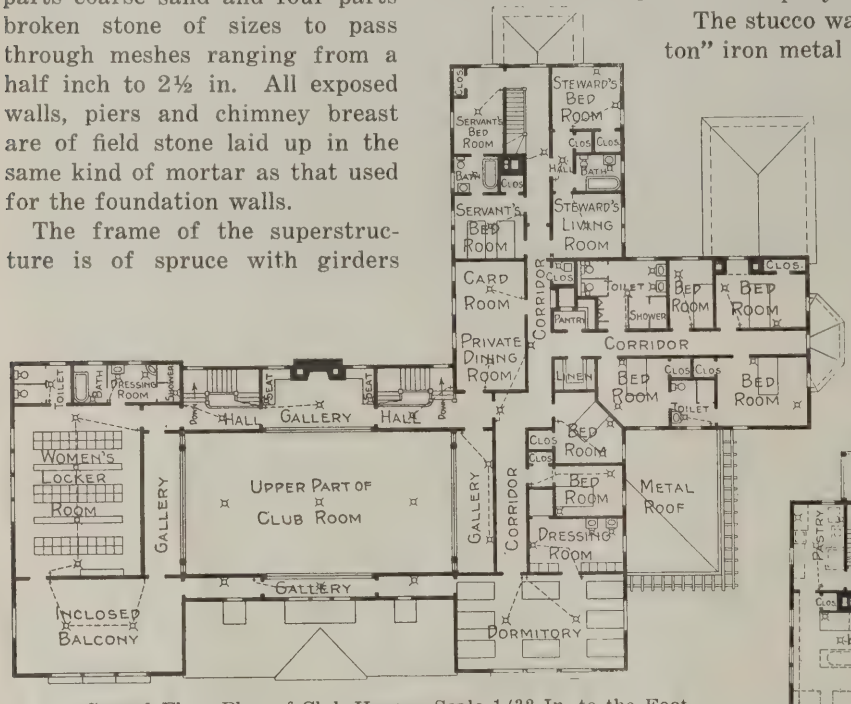
For the wood partitions in the cellar 2 x 4 in. cypress sills were imbedded in concrete. All floor joists are bridged with 1 x 3 in. strips and bearing partitions are bridged twice in height of first story and once in height of second story with 2 x 4 in.

All exterior walls of the house including dormers, and all ceilings of open verandas and porches, are covered with stucco applied in three coats. The first coat consisted of one part Portland cement, three parts sand and not more than 10 per cent lime putty with which was mixed 4 lbs. of hair to the barrel of putty, while the second coat consisted of one part Portland cement to 2½ parts of sand. The final coat consisted of one part Portland cement and two parts white sand, this coat being mixed with Medusa waterproofing applied in strict accordance with the directions of the Sandusky Portland Cement Company.

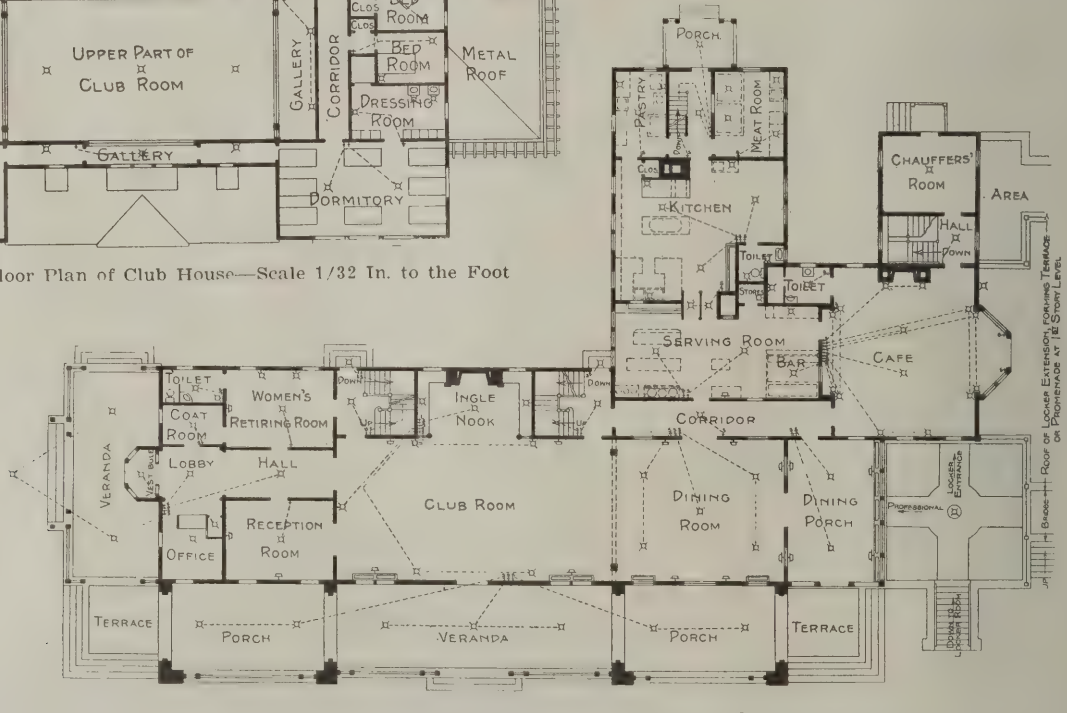
The stucco was applied to No. 24 gage "Hampton" iron metal lath attached horizontally to furring strips consisting of half-inch by 17 gage galvanized flat twisted wire spaced 9 in. on centers, the furring strips being placed over H. W. Johns-Manville Company's "Weatherite" brand of waterproof paper, which was used to cover the wall surfaces of the house.

All pitched roofs are covered with English interlocking tile,, red in color, made by the Ludowici-Celadon Company. The rafters were first covered with sheathing boards over which was placed one thickness of asphalt roofing felt weighing about 40 lbs. to the square. This was then covered with the tile in question and fastened with copper nails.

At the right of the main body of the building is the stone masonry locker extension, the plan and roof of which are given herewith. The roof is formed of slabs and beams of reinforced waterproofed concrete. The reinforcement of the slabs consisted of expanded metal and the concrete was mixed in the proportion of one part cement to two parts sand and four parts pea chips.



Second Floor Plan of Club House—Scale 1/32 In. to the Foot



First Floor Plan of Building—Scale 1/32 In. to the Foot

Home of Worcester Country Club—The L. W. Briggs Co., Architects, Worcester, Mass.

The inside face of the stone walls in the locker rooms, professionals, and drying room are cement plastered about one in. thick, the plaster being composed of one part of Portland cement and three parts of sharp sand.

The walls of the showers in the house have a hard plastered wainscot about 6 ft. 6 in. high; the serving room, kitchen, meat and pastry rooms and toilet on the first floor have hard plastered wainscot 4 ft. 3 in. high, and the dining room, passage to cafe, entrance, vestibule, lobby, hall, office, reception room and women's retiring room have hard plaster wainscot 2 ft. 6 in. high.

The entire bottom of the building, including boiler pit and basement floor of locker extension, is covered with a base course consisting of 3 in. of a 1:3:6 mixture of concrete. This in turn is covered with a finish coat ½-in. thick, composed of one part Portland cement and two parts sand.

The pergola roof is covered with 5-ply tar and gravel roofing, while all flat roofs are covered with a heavy layer of roofing felt and 16-oz. copper.

All exterior finish is gulf cypress, the veranda and porch posts and piers being of solid stock, planed but not sandpapered. Pergola posts and beams, except the projecting ends of the beams, are boxed, the posts being 7¾ in. square. The frieze and false timber work are of ⅞-in. stock and the false rafters are 2¾-in thick.

All outside doors to locker extension, professionals' room, servants', cafe and entrance doors are of golf cypress, while all other outside doors are Western white pine. Interior doors in the second story are "Korlock" birch, veneered two-panel stock design.

The doors showing the cafe are veneered cypress of uniform color. Heavy deadening felt is laid under the top floor in the first story except in the kitchen wing, and under all other top floors is 2-ply P & B paper. The floors of the cafe connecting toilet and entrance vestibule are of tile. The top floor in the second story of the house except in staircase halls, and galleries and in the kitchen wing of the first story, is 13/16 x 2¼ in. face No. 1 maple.

The trim in the club room, except for doors to staircase, halls and vestibule, is plain double trim, the cornice forming the head of the trim. That in the dining room, connecting corridor, reception room, women's retiring room, hall, lobby, office and club room doors already mentioned is ⅞ x 3¾-in. molded casings with ⅞-in. back band in two members.

The finish in the kitchen wing of the house, the basement and the servants' quarters is North Carolina pine. The finish in cafe adjoining staircase to basement and the dining porch is of gulf cypress. The remaining finish in the first and second stories is well as main staircase to basement is common birch painted.



Home of Worcester Country Club—View in Club Room Showing Ingle Nook at the Left and Dining Room in the Far Background

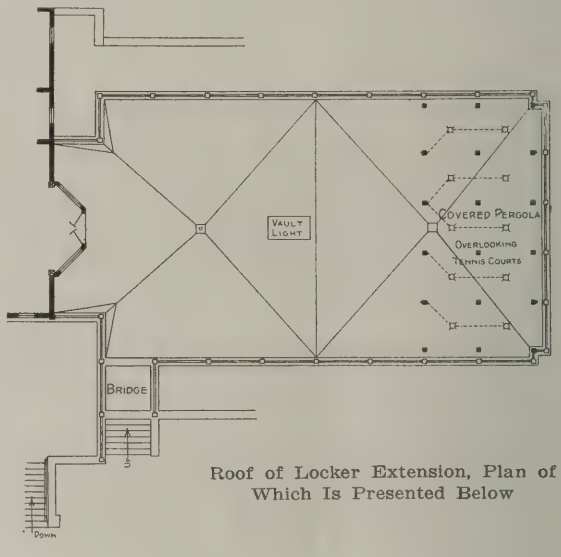
All stairs are built on 2 x 10 in. stringers placed 12 in. on centers. The main stairs from first to second stories have 4 x 4 in. square posts with molded cap and drop, a molded rail with ramps and easements mitering with cap and posts. The rails and posts are of red birch; the treads of maple and the balance of common birch to paint. The stairs from the cafe to the basement have maple treads with balance of finish of cypress.

The plumbing fixtures in the basement include four water closets, four lavatories, two urinals, four showers and three sinks; in the first story three water closets, three lavatories and one urinal; in the second story seven water closets, nine lavatories, two urinals, four showers, three baths and one slop sink.

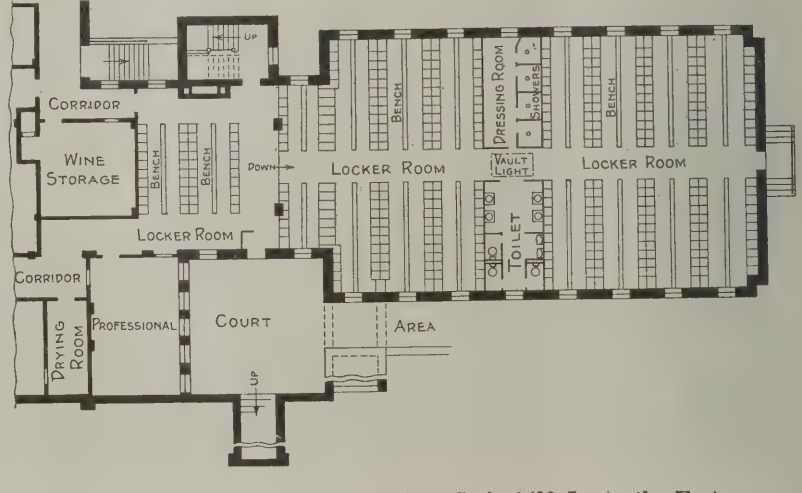
The outside doors, sash, blinds, lattice and frames and masonry walls were painted two coats while all other outside finish had two coats of linseed oil stain.

The cement plastered surfaces of outside stone walls, the brick masonry walls and the plastered partitions of the locker room, professionals' and drying room, and the corridor were given three coats of paint. The first consisted of Rice's "Granolith" and the second three coats of Rice's millwright gloss.

The building here described is the new home of the Worcester Country Club and was erected in accordance with plans prepared by L. W. Briggs Company, architects, 314 Main Street, Worcester, Mass. The general contractors were E. J. Cross Company, 32 Foster Street, and the contractors for the plaster and stucco work were Faucher Brothers & Company, 58 Front Street, all of Worcester, Mass.



Roof of Locker Extension, Plan of Which Is Presented Below



Plan of Men's Locker Extension—Scale 1/32 In. to the Foot

New Home of the Worcester Country Club

Some Comments on Slate Roofs

In a discussion of the subject of "Rendering Under Slate Roofs," which appeared in a recent issue of one of our London contemporaries, a participant presented the following views, which are interesting as showing a practice which prevailed in certain parts of England:

Rendering with haired mortar on the under side of slating is certainly a useful addition. If properly done it will make the roof much more equable in temperature, will prevent rattling of slates, and will prevent snow, soot and dust from being blown up under the slates and into the space between the ceiling and the roof.

An ordinary split ceiling lath should be nailed to the rafters between the slating battens as a key for the rendering. The additional comfort of a properly rendered roof should amply repay the extra cost.

Pointing of slate roofs used to be somewhat common, also "Torching," or rendering, to the under side where exposed to the wind. The fact that both have gone out of practice is evidence of failure to accomplish any lasting usefulness. Quite recently in a mid-Sussex village I saw a remnant of outside pointing to a slate roof which was of low pitch.

Old customs of the countryside are affectionately retained long after modern practice has proved them to be a failure.

The building employee of to-day is more or less a casual, a nomad among workmen; his predecessor was a bit of a dandy in his own estimation; rather an eligible person matrimonially. To apprentice a boy to a trade was equivalent to making a lifelong provision for the man. He was rather stiffnecked and tied to old ideas; old customs were to him the ideal of perfection; there was just the right way and wrong way for doing a job; little thought being given to immediate circumstance or expediency; as grandfather did it, grandson followed on, often with the same old tools.

When stone followed slabs as a roofing material, mortar was useful and necessary; it was a natural sequence that joints were pointed. There is still in existence a stone heeling firm who can trace back more than one century; they use different mortar from our Sussex sort, with less water, and it stands better. When tiles were used mortar again appealed to the workmen; other localities had slate less skilfully adapted than we now see it. Here again mortar appealed to the workman, and it keyed fairly well to the rough surface. As time

passed, improved means of sawing timber, the cheap production of more suitable nails, etc., gradually brought a change, the pitch of roofs was increased, levelling up was more carefully executed, and the fact that dry heeling in place of bedding with mortar was better was demonstrated.

The old-time workmen did not lay slates so tight and snug as is now the practice; less lap was given, low pitch for cheapness was common; slates side-stretched in their courses, for some reason, often out of level, caused a side pull instead of a straight-down weathering, and wind drove under and between lap, causing wet to follow inside. Pointing for a time held it back, and as often split the slates during wet and frost.

Torching inside to joints of slates and to battens, also pointing to outside, was common, and prevented wind drive. Both were sometimes adopted, each preventive was more or less suppurated by wet and helped to rot timbers; both were affected by vibration and became loose. Wind and storm strained them, repairs totally upset matters, it was at best an expensive patchwork, instead of a remedy. If pointing is necessary it is far and away cheaper to unroof and pay for proper knowledge and skill to cover again.

In the cheapest slating for sheds and washhouses, locally called "batcher," or "badger" heeling, the slates were given the least possible lap and side spaced to the greatest possible extent. Modern practice has proved that either slate or tile, if given proper fall and lap, can be laid to weather effectively without mortar on battens. Rough boarding and felt make a more effective job where a roof is exposed to rough weather; tiled roofing will follow flowing curves as architectural features to quaint dormers, and weather effectively.



Home of Worcester Country Club—The Ingle Nook on First Floor with Gallery Immediately Above

Workingmen's Houses in Chile

There has recently been commenced in Valparaiso and Vina del Mar, Chile, a large number of small houses for workingmen, the houses being of three different sizes, but all of them two stories in height. The beams, supports and roof timbers of each house are of oak, the interior walls of adobe and the exterior of brick, faced with cement. The roofing will be of galvanized corrugated iron. The interior height of the ground floor of each house will be 10 ft. 5 in., and the upper floor 10 ft.

The houses classed as "Type A" will cost about $2000 each, United States currency, this amount to be paid in instalments of $417 on the signing of the contract, $333 when the house is roofed, $250 on its delivery and the balance in twenty-one years, with payments of $13.33 monthly for the first 6½ years, and $5 monthly for the balance of the period.

Houses of the "Type B" class will cost about $2500 and the houses of the "Type C" class will cost $2834, the same general method of payments being made as in the case of "Type A" houses, the amounts, however, being correspondingly larger.



Some Aspects of Modern Shingling

The Wooden Shingle and the Best Method of Distributing the Bundles on a Roof—Nails to Be Used

By Edward H. Crussell

WE come now to the wooden shingle, for which an eminent authority gives the best wood as cypress, redwood and cedar, in the order named. "It is a difference of opinion that makes horse races," and men may easily be found who will disagree with him. The present writer is of the opinion that shingles made from any of these woods will make good roofs, the lasting qualities of which will depend as much upon the manner in which the work is done as upon the kind of wood used in the shingles. In other words, he believes a good quality of cedar shingles properly applied will outlast either a cypress or redwood roof of poor workmanship.

In considering the foregoing statement the attention of the reader should be drawn to the fact that it is usually much easier to get first quality cypress or redwood than it is to get first quality cedar.

Ordinary roofing shingles, as most carpenters are aware, are of random widths, and are put up in bundles. Four inches is the understood width of a shingle, and usually a bundle of shingles is equivalent to 250 shingles 4 in. wide, and four of these bundles are counted as a thousand shingles.

Exposure to Weather	Area Covered by 1000 Shingles	Number of Shingles Required for 100 Sq. Ft.
4 Inches	111	900
4½ "	125	800
4¾ "	133	760
5 "	138	720
5½ "	153	655
6 "	166	600
6½ "	181	554
7 "	194	515

Fig. 2—Table Showing Shingles Required for Various Lengths of Exposure to the Weather

On the Pacific Coast, however, a bundle of redwood shingles is only equal to 200 shingles 4 in. wide, although they also count them four bundles to the thousand.† It is no uncommon thing to hear the professional shingler ask, "What kind of bundles are they—full count, or California count?"

When estimating shingles for a given area in those parts where the two different counts are met with this difference must, of course, be taken into consideration, and the estimate made accordingly. It is easy to tell which count you are getting. A bundle of shingles is 20 in. wide, which is equal to five 4-in. shingles to the row. If the bundles have twenty-five rows on a side there are 250 shingles in the bundle. If they have only twenty rows on a side there is only 200 shingles in the bundle, and for estimating purposes one must figure five bundles to the thousand. Or, in other words, instead of ordering four thousand you must order five.

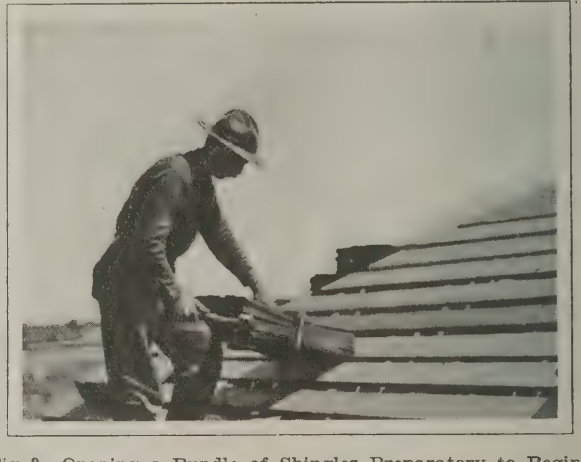


Fig. 3—Opening a Bundle of Shingles Preparatory to Beginning Work

Some Aspects of Modern Shingling

There are different methods of estimating the number of shingles required, all of them arriving at about the same result by different ways. One of the easiest methods follows: First find the number of square inches in the exposed portion of one shingle. Divide the number of square inches in one square foot by this figure, and multiply the square feet in area of roof by the answer.

Example.—Suppose the shingles are laid 4½ in. to the weather. Multiply 4½ by 4 (the width of the shingle) and the answer is 18. Divide 144 (the number of inches in one square foot) by 18, and the

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†Since these articles were prepared by the author the California Department of Weights and Measures has notified all shingle dealers that in future shingles must be sold on a full-count basis so that hereafter five bundles instead of four will be regarded as a thousand.

answer is 8. Therefore, when shingles are laid 4½ in. to the weather it takes 8 shingles for every square foot of roof surface.

This, of course, gives the exact number and



Some Aspects of Modern Shingling. Fig. 4—Pushing the Lower Rows of the Bundle in Between Roof Boards

allows nothing for waste. With good quality shingles on a straight gable roof allowance for waste need not be more than 2 per cent, if you are careful to figure in the double rows at the eaves and the necessary overhang. On irregular shaped roofs, with hips and dormers, the allowance may need to be increased to as much as 10 per cent.

Another way to estimate shingles is to take the length of the roof in inches and divide by 4, which will give the number of shingles required for each course. Then take the length of the rafter in inches and divide it by the distance the shingles are exposed to the weather. This, when the extra course at the eaves is added, will give the number of courses required for one side of the roof. Multiplying by 2 gives the number of courses for both sides of the roof, and finally, multiplying by the number of shingles in each course gives you the total number of shingles required.



Fig. 5—The Next Step in Distributing the Shingles

It takes just about the same number of shingles for a plain hip roof as it does for a gable, and the hip roof may be figured as a gable, allowing extra shingles for the hips if they are to be covered with what is known as "The Boston hip." In Fig. 2 is a table showing the number of shingles required for various lengths of exposure to the weather.

There is always a chance for argument regarding the kind of nails to use for shingling. Most people are agreed that cut nails are better than wire nails for this purpose, and one large association of shingle manufacturers advocates the use of copper nails. Climatic and other conditions have something to do with this subject, and a writer needs to be very sure of himself before making anything more than a general statement regarding it. As with the choice of wood, the kind of nails to be used is generally decided for the workman by the powers that be; but for the benefit of those with whom the cut nail is such a favorite, the writer would mention an experience he once had with a shingle roof on which cut nails had been used. This roof had a good appearance, but was leaking badly, and an examination as to the cause discovered the fact that around every one of the thousands of cut nails in that roof the shingles had rusted, worn, or eaten away until there were holes in them from ¼ to ⅝ in. in diameter.

The shingles, which were of redwood, had been on about fifteen years and apart from the holes were perfectly good; hardly a split in any of them and only a little worn on the exposed portions.

The foregoing is not set forth as an argument against cut nails, but merely to show that you cannot always tell. If it is left for the workman to decide he will certainly choose wire nails, because they are easier to handle and easier to drive. 4d. common and 3d. common are the kinds mostly used, though the professional shingler prefers 3d. fine. The writer has seen 2d. nails used on the lower courses of roofs so that the ends of the nails might not show through in the open cornice. Then further up the roof, where stout nails were not so much needed, the specifications called for 4d. common and the building superintendent saw that they were used too. It requires about 3½ lb. of 3d. or 5 lb. of 4d. wire nails to nail on 1000 shingles.

In some parts of the country, usually where the winters are severe, the roof sheathing is of tongued and grooved boards laid tight. In other parts the roof boards are squared-edged from 1 x 3 to 1 x 6 in. cross-section, and are laid from 2 to 3 in. apart. The smaller sizes are known as shingle lath instead of roof boards. This open joint roof sheathing is certainly the best for shingle roofs because it permits them to dry out better after



Fig. 6—Pushing the Tops Between the Roof Boards

rain. It is also much preferred by the shingler, because he can get about on it more easily and distribute his shingles to much better advantage.

On a close board roof he can hardly ever open more than one bundle of shingles at a time and will usually need some sort of a "jack" to hold the shingles and prevent them being blown away. On the open board roof he can open and distribute the shingles for the entire job if he is so minded and to keep them in place merely sticks the end of them between the roof boards.

Distributing the Shingles

This item of distributing the shingles is one portion of the work where the experienced worker forges ahead of the novice and although but a simple thing in itself, it has quite sufficient bearing on the cost of the shingles laid to warrant us looking closely into it before going further. Nothing is more wearing on the nerves of the man in charge than to watch an inexperienced workman open a bunch of shingles on a steep roof. Many of us have seen this performance and some of us have perhaps at some time taken part in it, so the matter need not be enlarged upon. It being better to use our space for the purpose of describing a good method than to pick out the flaws in a bad one, interesting though the latter may be.

Before distributing the shingles we must first get them onto the roof. This is usually accomplished by carrying them up a ladder, although there are conditions where a hoisting rig, with a line and single pulley, is the better way. Whichever way is decided upon, there is a chance for the man in charge to show his executive ability even in this small item. Some men can get around on a roof like a cat and others move so timidly they are always in danger of falling off. One man will hoist his bundle onto his shoulder, march up the ladder and onto the roof without missing a step or hesitating a moment. The next man will be all right until he gets to the head of the ladder and then finds it necessary to drop his bundle onto the roof before he can negotiate the crossing. It is things like this which decide whether it is better to let each man go the full distance, or to have some on the roof distributing while others are carrying them up the ladder. Each bundle of 250 will lay a patch about 5½ ft. square, which gives a pretty accurate idea of how to space the bundles.

Carrying Up the Shingles

It is only in special cases, of course, where all hands will be required to carry up shingles. Wherever possible this work should be done by apprentices or helpers; or in the absence of them by the men best fitted for it. The good shingler would rather shingle than carry up, and the poor shingler will usually prefer to carry up because he is anxious to prove that he can do something.

The writer has heard of cases where men competing with each other have carried up four or five bundles of shingles at a load. No doubt many of my readers have heard something of the same kind. The case about to be mentioned is different, but rather unique in its way.

There were some 90,000 shingles to carry up onto the roof of a new warehouse, the eaves of which were about 14 ft. from the ground. Two helpers, who had been hired the day before, were set at this work and told how to space the bundles on the roof. The foreman was busy with other matters, and when he returned some half hour later he found the two geniuses had decided that a bundle was too heavy to carry up the ladder, so they were opening them on the ground, taking as many as they could carry in one hand, and laying them on the roof in the required position. The roof being 1/3d pitch, the shingles refused to stay as placed and the appearance of that section to which they had directed their efforts can be more easily imagined than described. The foreman's description of it, and his ideas of the entire performance, as imparted to those chiefly concerned, covered the entire subject in a complete and forceful manner, but were unfortunately scarcely suitable for the present writer's purpose.

Best Method of Opening Bundles

One of the best ways of opening and distributing a bundle of shingles on an open board roof is as follows: Hold the bundle, as shown in the picture, Fig. 3; with the lower corner resting on the top edge of one of the roof boards and your knee pressing against the other end of the bundle. Now with one decisive blow of the hatchet open the bundle and at the same time push the lower rows of the bundle in between the roof boards with your knee, leaving the bundle as shown in Fig. 4. It is easy to sever the metal strip with the head of the hatchet if you know how, but it is easier yet to use an old hatchet or hand axe for this purpose and chop at the strip regardless.

To distribute the bundle, pick up a convenient full-length section of it (about one-tenth of the entire bundle) as shown in Fig. 5. Separate by bending them across the knee, put the butts together and push the tops between the roof boards, as shown in Fig. 6. The entire bundle can usually be distributed without moving the feet. It is best to open the necessary bundles first and distribute afterward. One advantage claimed for a method such as this is that the precision of the operation and the elimination of lost motion tend to a "speeding up" all along the line.

(*To be continued*)

Political Honors for a Prominent Builder

The members of the building fraternity of the eastern section of the country and especially of the New York State Association of Builders will be interested in learning that his Excellency Governor Whitman has appointed James M. Carter, the energetic secretary of the Association and of the Builders' Association Exchange of Buffalo to the office of State Superintendent of Prisons, succeeding John B. Riley, recently removed. While his loss to the building interests of Buffalo will be severely felt every one of his wide circle of business friends will wish him success in his new field of endeavor.

Building the Stucco-Coated House

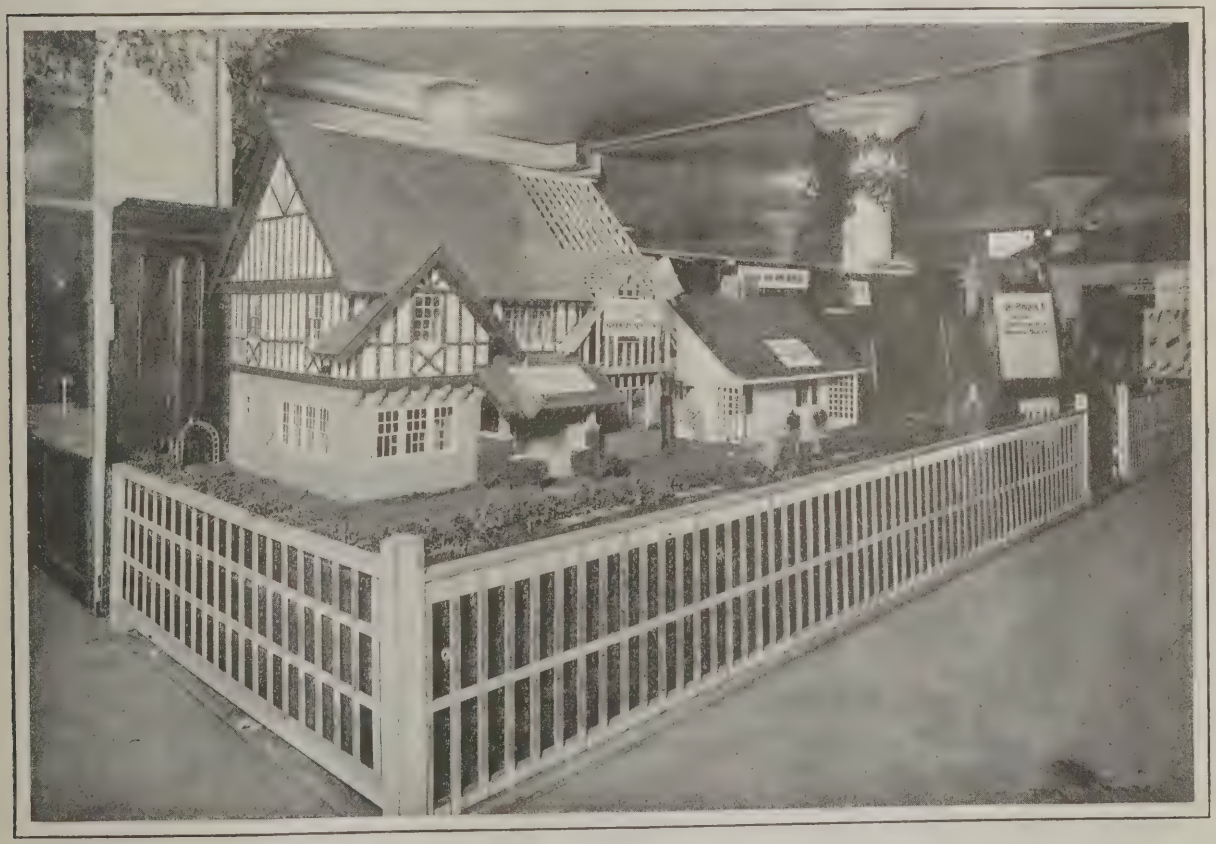
We take this occasion to announce that the photographs from which were made the two illustrations appearing in the above-named article in the February issue were loaned the author by the Garden City Sand Company, Chicago, Ill.



Some Attractive Exhibits —at the— Complete Building Show in Cleveland, Ohio.

"Community Displays" a Prominent Feature—The General Arrangement Most Unique—Great Interest Manifested in the Wide Range of Materials

SUPPLEMENTING the brief reference in our last issue to The Complete Building Show recently held in the city of Cleveland, we present herewith pictures which afford the reader a faint idea at least of some of the attractive features. In many ways the show was different from anything heretofore attempted in this country, and was in a measure inspired by the well-known Building Trades Exposition of London, England. Those instrumental in promoting the affair included the Society Advocating Fire Elimination, The Builders' Exchange, the Local Chapter of the American Institute of Architects and concerns engaged in the building materials line. What might be termed the floor plan arrangement was decidedly out of the ordinary in that the exhibits were displayed along aisles bearing street signs, which gave the visitor the impression he was viewing a miniature city. For example, there was "Broadway in honor of New York," "Tremont Street in honor of Boston," "Pennsylvania Avenue in honor of Washington," "Broad Street in honor of Philadelphia," "Michigan Avenue in honor of Chicago" and many others, signifying the wide importance which the show was intended to cover. The picture in the upper corner of this page represents a cottage built of cedar and located at the corner of Michigan and Pennsylvania Avenues.



A General View of the Display of the Southern Pine Association Showing the Model Cottage



One of the Several Model Houses Forming the Display of the Cleveland Board of Lumber Dealers

The exhibition, which lasted ten days, was notable in the fact that it in reality included displays of about everything used in the erection of a house. There were over 150 exhibitors, and their displays included hollow tile, building and paving brick, asbestos, asphalt, all types of shingles, domestic and foreign woods, cement, lime, waterproofing, water colors, metallic paints, coatings for concrete, wire cloth, electrically welded reinforcing for concrete, expanded metal, wire lath, builders' hardware, brick machines, concrete mixers, ventilating devices, paints, varnishes, etc., etc.

A section of the show which was the center of much interest contained the model of a New England cottage built of Arkansas soft pine and with paneling of Southern pine, the display being that of the Southern Pine Association. The picture presented upon the first page of this article gives the reader an idea of the display of this association, the cottage indicating the proper frame construction when using Arkansas soft pine.

The attractiveness of the displays was largely increased by providing what was known as "Community" exhibits; that is, a number of manufacturers of similar products united in making one exhibit, which obviously was much finer than would have been the case had each manufacturer provided a separate display. There were a number of these community exhibits, one of which was that of the Cleveland Board of Lumber Dealers, showing nine model houses built on a scale of 1 in. to the foot and located on a model allotment with driveways, sidewalks, shrubbery and trees. These houses were designed to show different types of wood exterior, shingles, siding, roofs, etc., and were executed in various styles of architecture. Two were of plaster and the rest were of wood, one being a replica of Washington's home at Mount Vernon. This exhibit occupied a space at one end of the Coliseum sufficiently large to permit of as many as 100 people at a time inspecting the various features of interest.

Another lumber exhibit included a model of a modern commercial building showing what is known as "mill construction"; that is, built of heavy timber frame work, so as to make it "slow burning."

The Gum Lumber Manufacturers' Association had an interesting exhibit of red gum which can be finished in most beautiful effects, and which is used for interior trim and fine cabinet work. A view of the red gum booth is shown herewith, the design



Another of the Model Houses with Thatched Roof Effect Displayed by the Board of Lumber Dealers

representing the side of a room fitted with fireplace and mantel and flanked on one side by a book case. Other lumber exhibits included displays by the California Redwood Association and the Southern Cypress Manufacturers' Association. The display of the latter is shown in the picture at the bottom of the facing page. The conspicuous feature is a bungalow of clever design with pergola effect, while around the sides of the booth are panels of cypress, showing the varying effects which may be produced with the wood.



Exhibits at the Complete Building Show—The Red Gum Display

In connection with The Complete Building Show was a competition in $3000 houses for which several cash prizes were offered. This was conducted under the auspices of the Cleveland Art Association, and something like 300 sets of plans were submitted. The names of the prize winners are announced in another part of this issue. The stucco cottage with slate roof, awarded the first prize, was on exhibition in the shape of a model made to a scale of 1 in. to the foot. In addition a full-size living room and drawing room were built from the plans and completely furnished. As part of the program a $6000 model house was given away, the house being of brick and plaster exterior with interior trim of wood, excepting the first floor, which was finished with Berger's metal lumber. A green tile roof covered the house.

Another attractive community exhibit was of hollow tile and made by five hollow tile manufacturers of Cleveland. This also included the side of a tile wall covered with stucco. As a part of the display there was a new self-facing tile—a hollow tile with a wire rake surface requiring no facing whatever and made by the Ohio Clay Company.

Another community display was that of the Face Brick Manufacturers, which included an attractive bungalow with tile roof, a garden, a fence, a garden wall and pergola. About twenty different kinds of brick were shown in this exhibit, and it has been left as a permanent feature of the Coliseum. An idea of the display may be gathered from an inspection of the picture which shows a portion of



The Model Bungalow and Booth Showing the Display of Southern Cypress Association

the exhibit. In arranging the brick exhibits, the building of brick panels was practically eliminated and the brick laid up in various forms as they would appear in actual building construction. The exhibit was made by the Ohio Face Brick Manufacturers' Association in conjunction with a few brickmakers from other States.

W. C. Shires of Cleveland gave the first exhibition of his new system of pouring reinforced concrete hollow walls, floors and roofs without using falsework or forms. A continuous wire mesh takes the place of forms, and the cores are placed inside the mesh before pouring. They may be run horizontally or vertically, as conditions require, and may be round, oval or any other form or of any dimension. For ordinary work in the construction of an 8-in. wall a core 8 ft. long, 11 in. deep and 4 in. wide is used. The core is of 32-gage sheet metal and has a slit joint. The wall is poured 1 ft. at a time, one core being put in each section, making 1 in. of solid wall between the cores. The wire mesh has three wires to an inch for the wall and five wires to an inch for the floors and roofs. It is claimed that this system of pouring saves 64 per cent of the concrete, as compared with a stone wall, and that by using it a building can be erected complete at 18c. per square foot, including finishing inside and out.

H. W. Johns-Manville Company showed its line of asbestos shingles and other building products, while several of the Cleveland supply dealers had tastefully arranged exhibits of many kinds of building materials.

The Berger Manufacturing Company, Canton, Ohio, showed fireproofing building specialties, including cores for reinforced concrete floors, prong lock studs for fireproof partitions, etc. A section of the wall, floor and ceiling of a building was erected to show the use of the face steel joists and metal lath in building work.

The Sandusky Portland Cement Company had a very attractive exhibit of fountains, fences and railings made of Medusa white Portland cement.

The Cleveland Cement Users' Association in a community exhibit showed cement products, including artificial stone columns, urns and other decorative articles.

The Farr Brick Company had as its exhibit an old-fashioned Dutch kitchen with huge rafters, a capacious open fireplace and brick oven.

Not the least interesting feature of the show was a model of a poured concrete cottage worked with steel forms recently developed by the Hydraulic Pressed Steel Company of Cleveland. The statement was made that with these forms a cottage 21 x 35 ft. in plan has been poured in three hours.



Exhibits at The Complete Building Show—Section of a "Community" Display Made by Manufacturers of Face Brick

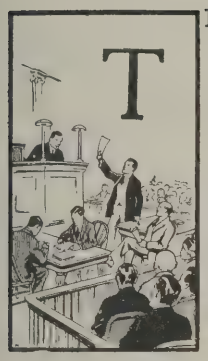
New York's Latest Skyscraper

Instead of erecting a thirty-two story office building, for which the company filed plans in March, 1914, the American Express Company has decided to erect on the site of its present structure in lower Broadway a fifteen-story building, the plans for which have been prepared by Redwick, Aspinwall & Tucker, 8 West Fortieth Street, New York City. The building will be for the exclusive use of the company and is expected to be ready for occupancy by Feb. 1, 1917. The contract will be executed by the Cauldwell Wingate Company, 381 Fourth Avenue, New York City.

Three Contract Clauses Construed

Necessity for Formal Claim for Time Extension— Measure of Contractor's Recovery for Destroyed Work

By Arthur L. H. Street



THE following review of two late and important court decisions will serve to illustrate the practical impossibility of so wording a building contract as to make it dispute proof and so plain as to afford no reasonable basis for litigation, especially as against unexpected circumstances such as were involved in the first-mentioned case. But the continued volume of court decisions interpreting the scope of construction contracts should serve a useful purpose in gradually pointing the way toward the formulation of standard forms of agreement which will minimize the troublesome and expensive disputes which arise under loosely drawn contracts.

Delay Clause Interpreted

The right of a firm of contractors to an extension of time for the completion of a building, where no written claim for an extension had been given, was passed upon by the Texas Court of Civil Appeals in the cast of Crisman & Nesbit.

The original plans and specifications called for a girder through the building intended as a support for the ceiling joists. As the work progressed it was discovered that according to the plans one end of the girder projected into a window, and it was necessary to re-arrange the plans so as to provide a support for the girder. The superintendent for the owner consumed about two weeks in preparing new plans or details to meet the emergency, and in the litigation which followed between owner and contractors the owner refused to permit the delay charged against him, because no written claim had been filed under the following clause of the contract:

"Should the contractors be obstructed or delayed in the prosecution or completion of the work by the neglect, delay or default of any other contractors, *or by any alteration which may be required in the said work,* or by any damage which may happen thereto by fire, or by the unusual action of the elements, or otherwise, or by the abandonment of the work by the employees through no fault of the contractors, then there shall be an allowance of additional time beyond the date set for the completion of the work; but no allowance shall be made unless a claim is presented in writing at the time of such obstruction or delay. The superintendent shall award and certify the amount of additional time to be allowed; in which case the contractors shall be released from the payment of the stipulated damages for the additional time so certified, and no more. The contractors may appeal from such award to arbitrators constituted as provided in article third of this contract."

In holding that this section did not apply to the delay involved in this case, the court said that the purpose in requiring the contractors to give notice in writing of delays occasioned by others was to afford the owner a prompt opportunity to investigate and end same, but that the provision for written notice of delays caused by others could not be invoked by the owner in case of delays due to the fault of the owner, except in cases "requiring alterations." Holding that no "alteration" was involved in this case, the court says:

"It [the girder] remained in the same place in the building where it was originally placed. The sole purpose of the delay was to give the owner's superintendent time within which to prepare details or plans for the building of some sort of base or foundation for the girder in or about the open space into which the original plans carried it. Delay for the purpose of adding to or curing omissions in the plans adopted for remodeling the building cannot fairly be said to be an alteration of the work already planned. The original plans were not altered, rather they were added to."

It was also decided by the court that the contractors were entitled to allowance for delay resulting from the superintendent's loss of the specifications for the windows of the building, although no written claim had been made under the clause of the contract above quoted, since that was a delay not occasioned by any alteration in the building or by the fault of other contractors.

A contract for the erection of a building contained the following clauses:

"Fifth. The owner agrees, in consideration of the performance of this agreement by the contractor, to pay or cause to be paid to the contractor, his legal representatives or assigns, the sum of $23,100 in United States gold coin, at times and in the manner following, to wit: Seventy-five per cent (75%) of the amount completed on the first and fifteenth days of each month, the balance to be paid thirty-five days after notice of completion is filed: Provided, that when each payment or installment shall become due, and at the final completion of the work, certificates in writing shall be obtained from said architect, stating that the payment or installment is due or work completed, as the case may be, and the amount then due; and the said architect shall at said times deliver said certificates under his hand to the contractor, or in lieu of such certificate shall deliver to the contractor under his hand a just and true reason for not issuing the certificates, including a statement of the defects, if any to be remedied, to entitle the contractor to the certificate or certificates. * * *

"Twelfth. In case the work herein provided for should, before completion, be wholly destroyed by fire, defective soil, earthquake, or other act of God, which the contractor could not have reasonably foreseen and provided for, then the loss occasioned thereby shall be sustained by the owner to the extent that he has paid installments thereon, or that may be due under the fifth clause of this contract; and the loss occasioned thereby and to be sustained by the contractor shall be for the uncompleted portion of said work upon which he may be engaged at the time of the loss, and for which no payment is yet due under the fifth clause of this contract."

When more than $17,000 worth of work and materials had been furnished by the contractor, the whole of the partly constructed building was destroyed without his fault. Thereupon he claimed the full contract price of the work done, but the owner disclaimed liability beyond 75 per cent of the amount which had fallen due before the fire, according to the terms of clause 5 of the contract. In sustaining the contention of the owner, the California Supreme Court said:

"The payments to which the contractor was entitled while construction was in progress consisted of 75 per cent. of the value of the work completed on the 1st and 15th days of each month. The remaining 25 per cent was not due until thirty-five days after completion of the building. How, then, can it be claimed that the contractor was entitled to receive anything more than 75 per cent of the value of the work done by him? The 25 per cent, in value, of the work done, was clearly a portion of the work for which no payment was yet due under the fifth clause of the contract, and the loss of this, under the agreement, fell on the contractor."

The fire having occurred between the 15th of one month and the 1st of the next, the court held there could be no recovery for work done after the 15th.

A Suburban Cottage of Six Rooms

Foundations of Concrete with Brick Underpinning —Walls and Roofs Are Covered with Shingles



THE interest which attaches to conveniently arranged dwellings of the cozy cottage type of architecture has moved us to present as the basis of our colored supplemental plate this month a design of this character. The cottage is of frame construction, with 10-in. concrete foundation walls resting on footings of concrete 10 in. thick and 22 in. wide, all concrete to be mixed in the proportions of one of cement to three of sand and five of broken stone. The exterior frame is to be covered with sheathing boards over which is to be placed a heavy layer of building paper, this in turn being covered with red cedar shingles laid 5½ in. to the weather on the roof, 4 in. to the weather on porches and dormers, and 5 in. to the weather on the sidewalls. Before being laid the shingles are to be dipped in Cabot's shingle stain.

Arrangement of Rooms

The cottage has been designed to occupy a plot of ground having a frontage of 75 ft. and a depth of 100 ft. An inspection of the plans presented on the facing page shows the feature of the layout to be the living room, which occupies the entire central portion of the building, extending from front to rear and communicating at both fronts with a covered porch through casement doors. At one end of the living room is an open fireplace with red brick hearth. At the right of the living room is a passageway communicating with two sleeping rooms and bathroom, while at the left is a sleeping room and the kitchen. In the attic is a fourth sleeping room.

The living room is also intended to be used as a dining room, although in the summer months the screened porch at the rear can be used for this purpose if so desired.

The Chimney

One chimney supplies the kitchen, the living room and the furnace in the cellar. The entrance to the cellar is by means of a stairway leading directly from the kitchen. The chimney is to be built of common brick laid in a good cement mortar and the three flues to have vitrified flue lining. The chimney breast below the mantel shelf in the living room is to be covered with stucco and tile set in, as indicated in the details, with a tapestry brick base.

The cellar is located under the kitchen wing of the house, and contains the furnace and storage rooms, the floor being of concrete and the walls whitewashed.

According to the specifications of the architect, the first floor beams are to be 2 x 10 in., placed 16 in. on centers; the second floor beams 2 x 6 in., placed 16 in. on centers; the rafters 2 x 6 in., placed 20 in. on centers. The plates and corner posts are to be 2 x 4 in., the sill 4 x 6 in. and the studs 2 x 4 in., the latter being placed 16 in. on centers. All beams are to be of spruce.

Floors and Trim

The rooms of the first story are to have double floors, with building felt placed over the sub-floor. The finish floor is to be of ⅞ x 2½ in. North Carolina comb-grain pine. The attic floor is to be ⅞ x 4 in. pine.

All doors and trim are to be of cypress. The windows and door frames, as well as all outside trim, are to be of white pine.

The bedroom in the attic, as well as ceiling of cellar, is to be finished off with a good wall board.

The interior walls of the cottage are to be plastered two-coat work, with a sand finish in the living room and a hard, smooth finish in all other rooms. The walls in the living room are to be paneled off to the height of the mantel shelf with 4-in. plain strips. The plastering, having a sand finish, is to be tinted in the panels and above to the picture mold a deep golden yellow. The ceiling and plaster cornice down to the picture mold is to be a delicate warm gray. The stucco of the mantel is to be tinted a cream color and the tile is to be dark red. All living room trim is to be stained a deep rich brown with a dull finish.

The Kitchen and Bathroom

In the kitchen and bathroom the trim is to be enameled white and the walls and ceiling treated with a waterproof paint.

The bedroom trim is to be stained and the walls painted, carrying around each room a paper border which shall be in harmony with the tints selected for the walls. The ceilings are to be left white.

The living room trim and doors are to be stained and rubbed to a smooth dull finish.

The floors of the various rooms are to be filled and finished with two coats of wax and polished. The trim and doors in the bedrooms are to be stained and brought to a dull finish.

The kitchen and bathroom are to have three coats of enamel paint.

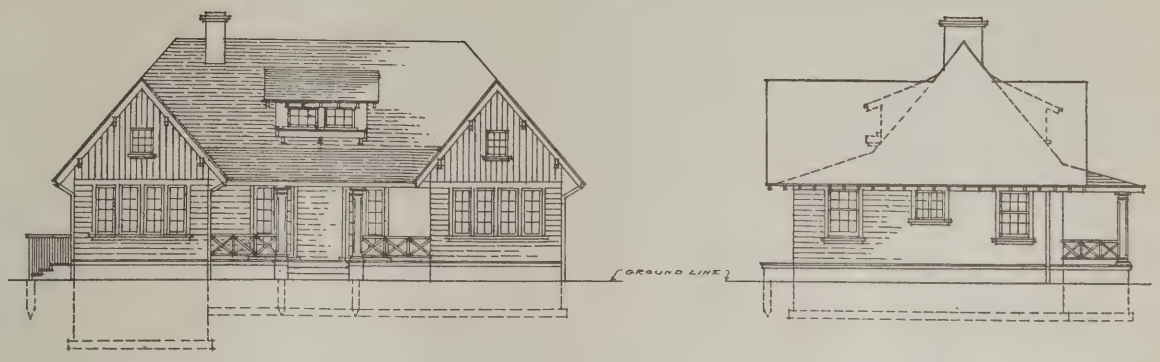
The outside trim is to be primed with lead and oil and given two coats of paint. Both sides of the sheet-metal work are to be treated with two coats of mineral paint.

The hardware throughout the house is to be of a bronze plate finish and the glass used is to be double-thick American of the best quality.

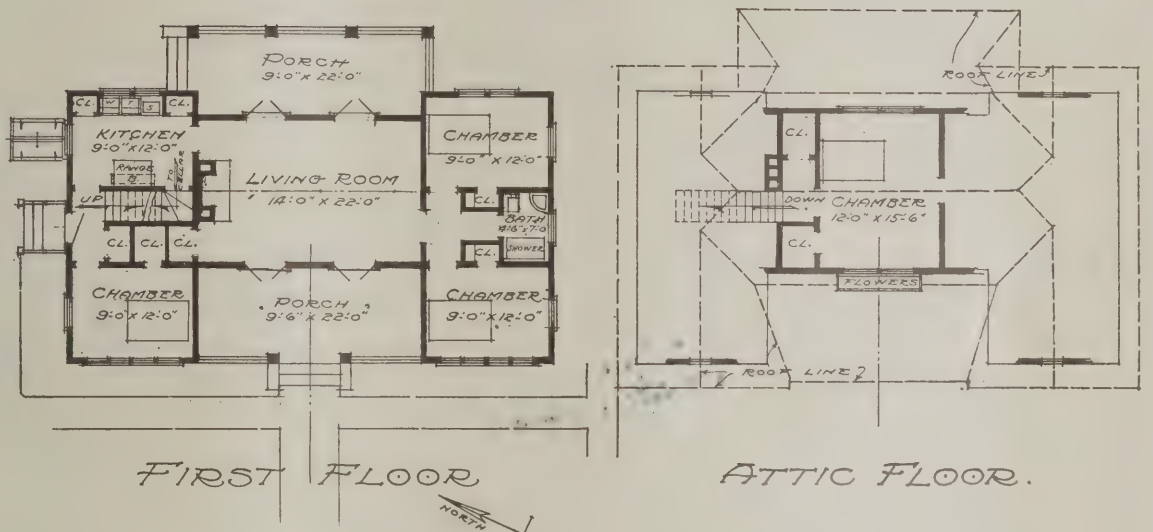
The plumbing is to be of Standard make, and all exposed pipes in the bathroom are to have a



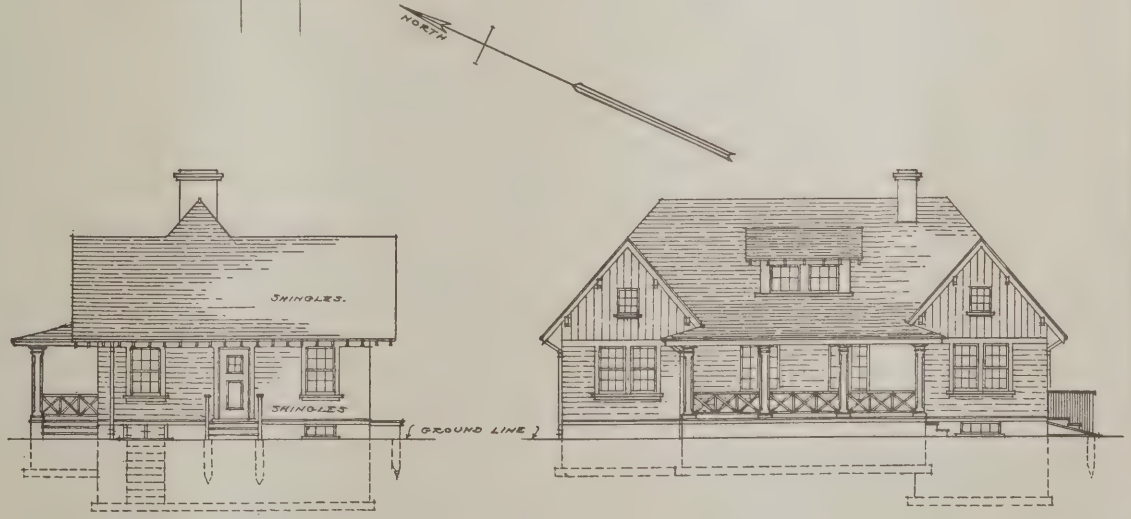
BUILDING AGE



WEST ELEVATION. SOUTH ELEVATION.



FIRST FLOOR ATTIC FLOOR.

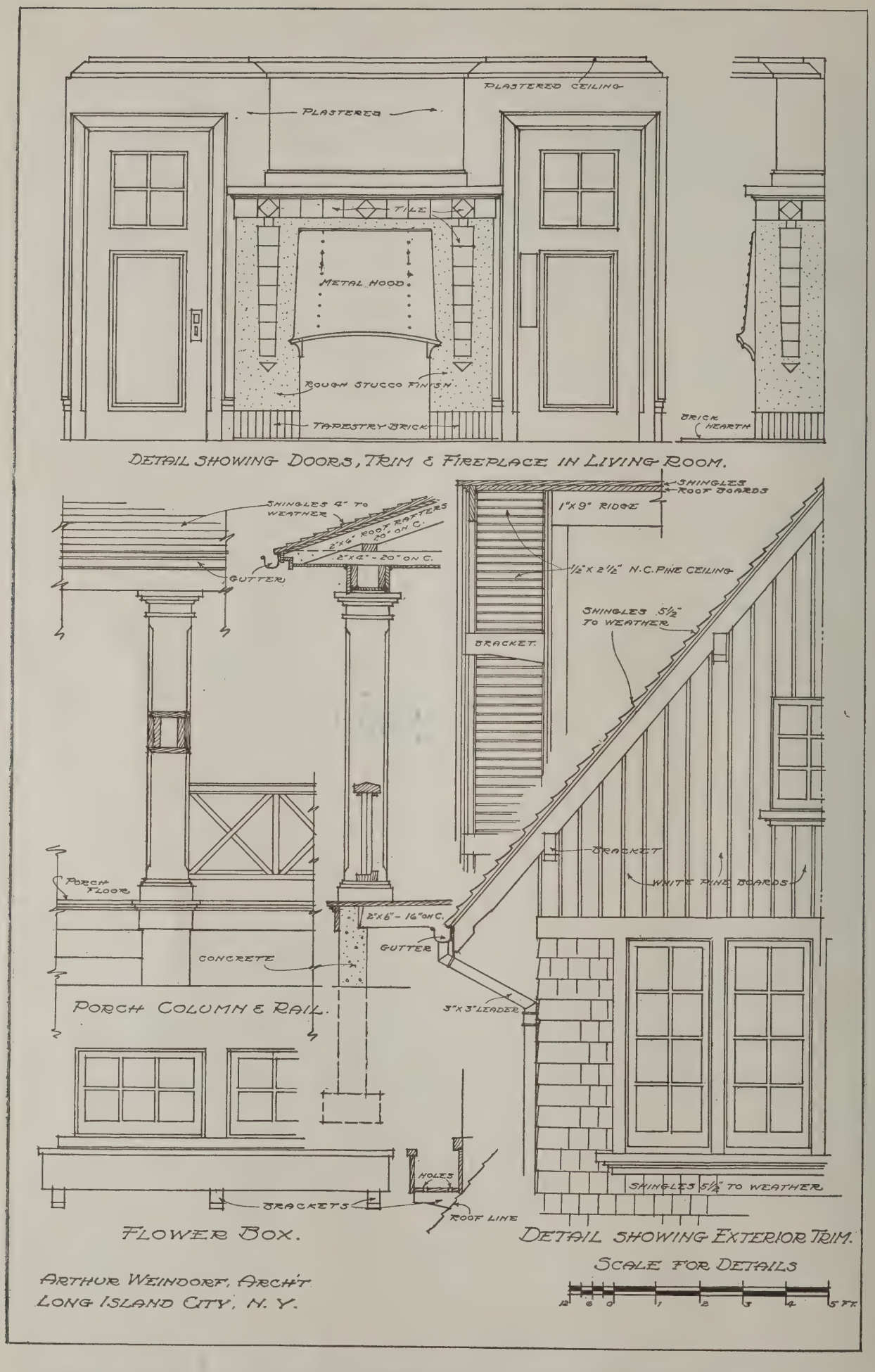


NORTH ELEVATION EAST ELEVATION.

ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N.Y.

SCALE IN FEET.
0 4 8 12 16 20 24.

Plans and Elevations of the Suburban Cottage Shown on Our Colored Supplemental Plate



Miscellaneous Constructive Details of the Suburban Cottage Shown on Our Supplemental Plate

nickel-plated finish. All the rough pipes exposed in the kitchen are to be painted with enamel paint. The kitchen is to contain an iron enamel sink, a two-part soapstone wash tray with removable perforated metal covers, and a 40-gal. galvanized iron hot-water boiler over the range. The bathroom is to be equipped with complete shower-bath arrangement, a water-closet with china bowl and low-down tank, and washstand with marble top and china basin. All fixtures are to be properly supplied with hot and cold water. The bathroom floor is to be covered with square tile and have a sanitary cove and base.

All rooms are to have outlets for gas fixtures, and so arranged that combination electric and gas fixtures may be used.

The down spouts shall be 3 x 3 in. square and shall be made of corrugated galvanized iron.

It is intended that the cottage be heated by furnace installed in the cellar and of sufficient size to heat the building to 70 deg. in zero weather. All hot-air ducts are to be covered with asbestos, and all registers are to be of such a finish as to match the hardware.

The house is to be wired for electric lighting, and all rooms are to have at least two outlets.

The architect calculates the cubical content of the house at 25,197 cu. ft. and the cost at 18c. per cu. ft. He states that the estimate and specifications are based on prices, labor and materials on Long Island about 30 miles from New York City.

The architect is Arthur Weindorf, Long Island City, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Convention of Builders' Exchanges

National Body Meets at Baltimore—President Lewman Delivers Stirring Address—New Officers Elected

WHAT was undoubtedly the most successful meeting of builders of the country both as regards numbers and interest manifested, occurred in the city of Baltimore, Feb. 22 to 24 on the occasion of the fifth annual convention of the National Association of Builders' Exchanges. The gathering was highly representative of the building interests and the delegates in attendance numbered nearly 500. The sessions were held in the Roof Garden of the Emerson Hotel, and as fast as the members arrived they were presented with badges and copies of a handsome booklet entitled, "Baltimore of To-day," containing much information and many pictures of the city. The early arrivals among the delegates attended an informal reception given by the Baltimore Builders' Exchange and the Ladies Auxiliary Committee to the delegates and guests on the evening of Feb. 21. The reception committee, headed by James A. Marrian and A. H. Sieman as chairman and vice-chairman, also included President Herbert J. West and Secretary I. Herbert Scates of the Baltimore Builders' Exchange, and Vice-president John Trainor of the National Association.

Tuesday's Session

The first session of the convention proper was held on the morning of Feb. 22 with President H. L. Lewman in the chair. This session was largely taken up with greetings by Vice-president John Trainor of the National Association, and addresses of welcome by Secretary of State T. W. Simmons, Assistant City Solicitor B. H. McKindless and Herbert J. West, president of the local Exchange. Response was made by Ralph McLauran of San Francisco, who was warmly applauded.

The address of the morning was by R. Clipston Sturgis of Boston, a past-president of the American Institute of Architects. The speaker asserted that the present system of placing bids and grinding prices down to the depth of inferiority was nothing short of a blot on the reputation of honest and straightforward builders who are forced to share the disfavor resulting from a bad system. He urged a remedy whereby owner as well as builder, contractor, engineer, architect and mechanic would mutually profit. He suggested a general getting-together, which for its principal purpose would have a building-up of confidence and the abolition of internal discord. After this confidence had been brought into existence the public should be educated to the fact that there really existed honest and honorable persons in the United States who are willing to give and take a fair deal.

In bitter terms the speaker condemned petty specializing where lines are drawn and mechanics are not allowed to overstep a certain mark which bounds their province in the construction of a building. This he said, no matter what price the mechanic was paid, was unfair to him inasmuch as it necessarily hindered his education and privileges without apparent reason.

Principal among the things to be accomplished, he said, was confidence. This, once generated, would create a different spirit in the business world and would result in the realization of real Christianity—faith in fellow man, all of which he stated would work out a beautiful system of fair dealing, and was after all, the goal of the builders' exchanges of the country.

The president then appointed committees on Credentials, Constitution and By-Laws, Resolutions and Conference. President Lewman also appointed the following as assistant secretaries for the convention: C. H. Bowen, John Hauch, A. J. Mahon, C. P. Massard, Daniel Carey and O. G. Albrecht.

In the afternoon the delegates and their wives

were taken on an automobile sightseeing tour of the city, and in the evening the delegates were treated to an oyster roast at Recreation Pier.

Wednesday Morning Session

The second day's proceedings consisted very largely of the presentation of reports and discussions thereon. The event of the session was the address of President Lewman, extracts from which follow:

President Lewman's Address

Four years ago our National Association was formed for the purpose of advancing and protecting the interests of the builder. Volumes have been written upon the most desirable methods of attaining a complete and closely related system of organization, and many ingenious suggestions have been advanced. But the difficulties are very great and the factors and interests to be co-ordinated are numerous and diversified. We have reached certain definite conclusions and have developed policies with reference to the fundamental principles of organization which coincide with the views of many observant men. The general acceptance of these principles with our actual concrete achievements, and the benefits we have already derived, assure us that we are on the right road, and are progressing toward the formulation of a complete Code of Practice, the most stupendous and necessary problem with which the builder has ever grappled.

Since the dawn of civilization it has been the duty of the builder to provide habitations for mankind. In so doing, he has constantly been confronted with many serious problems. He has successfully coped with those of handicraft and construction which is evidenced by the wonderful skyscrapers and other building marvels of the age. This success has been an important element in the improvement of our country; but the wonderful development of the purely mechanical part of the builder's work has not been accompanied by a like improvement in his business customs and methods—in fact these are in many ways very crude and have only slightly advanced in the past century.

Mechanical Progress of the Builder's Work

This mechanical progress of our business is noticeable, in a variable degree, throughout the domain of the building industry, and shows the facility with which the purely structural and engineering problems have been mastered. We see the best organized companies in the world to-day in the realm of the building business. These wonderful machines work with a precision that excites the admiration and envy of all, and the men who are their leaders are capable of effective organization in any line of business. It is remarkable that this marvelous talent, which they have developed, should be coupled with, and hampered by antiquated, unfair and burdensome methods and be conducted in such an immature and rambling manner in what may be termed the commercial or business side of our vocation.

We all appreciate fully our responsibilities and obligations to our fellow men in the development of economical construction and mechanical efficiency, nevertheless our primary and fundamental purpose is to reap the value of our services for the support and comfort of ourselves and dependents. We must also appreciate the fact that the highest mechanical skill can only be reached under sound business conditions and that the development we have attained along structural lines has been achieved in spite of our stunted and neglected business growth. In the matter of erecting a steel framework, placing a difficult foundation and all the many practical propositions the builder faces from day to day, we must recognize the soundness of judgment and skill with which he handles problems that would baffle men whose capacity had not been developed along such strenuous physical lines. But notice how differently he acts when it comes to the wording of a contract, and how many important latent and implied obligations he carelessly and needlessly assumes. As an illustration: we permitted the architect until recently—and still in some localities—to be the final judge, without appeal, of his own acts, documents, and errors, thus waiving our rights to appeal to arbitration or the courts in case of disputes or differences. Such a condition exists in no other branch of commerce or industry in the civilized world. The courts when called upon to interpret and adjudicate such arbitrary conditions, have uniformly shown a great repugnance toward their manifest injustice having frequently called the attention of owners and builders to their oppressive and unbusinesslike character.

Business System of the Builder

The builder spends large sums of money annually under a business system which has advanced but little since the early days. The savage knew the number of beads or amount of liquor he was to receive for his furs, but the builder, when he contracts for work under the old contract documents, names a price to erect a building, leaving many of the important elements that determine its cost to be "decided as the work progresses." He often receives his pay at the "discretion of the architect" instead of at fixed times, as is customary in all other lines of business. He assumes responsibility for buildings and guarantees the integrity of heating, electrical and plumbing systems, conceived, planned and executed under the direction of another, and leaves in the owner's hands, large sums of money to make good defects for which he is in no way responsible. He agrees to execute the work with the very noticeable absence of an accurate definition as to what constitutes quality. He accepts responsibility and guarantees the soundness and capability of mechanical and engineering constructions when he has no voice in determining their materials or design. In dealing with architects and owners, how many unreasonable burdens are imposed and just claims denied for want of technical business knowledge or attention! In competition how foolishly he allows conditions of unfairness, treachery, auctioning of bids, and other well known and easily remedied evils to exist! In fact our lack of ethics in the manner of conducting competition is appalling.

A chain is only as strong as its weakest link and it will not profit us to excite the wonder and admiration of the world for our mechanical achievements if we continue to excite its amazement at our lack of business prudence. It is the weak part of any structure we hasten to strengthen. It is not the strong and fully developed part that needs prompt and careful attention. I cannot pass from this subject without saying that there is no sadder sight than that of a thoroughly capable and proficient builder coming to the end of a useful and industrious life of true public service, impoverished and dependent because of his lack of business precautions and ability to reap the financial reward of his efforts.

Code of Ethics

It is singular that such an important industry has never developed some well-defined Code of Ethics under which to conduct its business, in order to be fair to all interested parties, as have all other branches of commerce and professions. This is a serious problem, and one in which we have the most intense interest. We have two splendid examples of organization after which to pattern; the banks and financial institutions with an organization for full co-operation, providing its members with all reasonable protection, and business information, and we have the different laborers and mechanics with a nation-wide organization whose conditions are recognized in practically every section of the country. Contrast these two associations with the builders, who generally act independent and as individuals and who are proceeding under unsound and archaic commercial methods, generally failing to consider and co-operate with fellow craftsmen. As our business is conducted to-day, we meet in common centers to enter competition, ungoverned and uncontrolled by ethics and often without fair intentions, each man being a free lance, allowed without restraint, to follow his own ideas regardless of whether they are honest, fair to others, or businesslike. He is permitted to

pursue his objects and often performs deeds that of a character dangerous to business principles, unfair to owners, fellow builders, and the business community, often casting all ideas of fair dealing and business protection of himself and his calling to the four winds.

Bids are many times secured under what practically means misrepresentation and the violating of pledges either made or understood. They are invited and received under an actual or implied promise of an award to the lowest responsible bidder and then immediately rejected; resulting in practically an auction, where all ethics and fairness are ignored. To call for bids with no intention to award the work to the lowest responsible and competent bidder is fraudulent, and rejecting them and calling for new proposals upon some slight pretext or change is generally deliberate misrepresentation. Sometimes this is intended to be used as a basis for future negotiations; sometimes to favor a bidder in an endeavor to secure the work for him, and often other motives equally unfair and unbusinesslike.

We find bids that require great knowledge and expense in their preparation treated without reasonable consideration; large sums expended in competition when the work is never awarded, and no compensation given the bidders; misrepresentation and unfair means used to force down the price of a bidder and many obnoxious and inequitable actions. To stamp out these practices which are harmful to the architect, the owner, and the builder, should be our aim and purpose. These and many other improprieties and irregularities that permeate the whole system of receiving bids, awarding and conducting building contracts should have immediate attention and be settled in a manner fair to all, and in this progressive age, these constitute a national question which can only be determined and brought to a finality by national consideration and co-operation. A just settlement means a new era of businesslike procedure in the conduct of building—a day to be welcomed by architects, builders, and owners and all the interests creating the owner's investment.

We have a striking illustration of the importance of this question before us. Our Federal Government for the protection of public carriers and other branches of commerce, prescribe methods, minimum rates, and other essential fundamentals in order to protect the public and to conserve the interests of all concerned. Likewise we have federal laws governing corporations, powerful companies and individuals that prevent them from destroying the weaker competitors or imposing unfair or burdensome methods on others. We find many prominent attorneys devoting their life and thought to this question; the courts of our land writing opinions on what is proper and what is improper.

I mention this to impress upon the builder the immensity and importance of this question that is receiving the thought of the greatest minds of our nation, while our vocation is apparently idly drifting and failing to give the proper attention to this important phase of our business, when as a matter of fact, we should be studying this question and be represented in its consideration and just settlement as practically all other branches of commerce are doing to-day. Of course our aims and purposes should always be to bear ourselves creditably among our fellowmen; and our thoughts, expressions and actions should be at all times made clear that we are not seeking to form an organization to restrain or throttle fair competition, but that we wish to encourage competition on equitable lines. What we seek is organization for the protection, advancement and conservation of our interests against unfair business practices and to promote stable and well-organized business institutions, in order to render good service. Our highest courts have drawn a clear line of distinction between these two types of organization prohibiting the former and encouraging the latter.

We should conduct our business in such a manner that builders' organizations in the public's mind will be synonmous with honest and fair dealing, sane and correct business principles, and for whatever tends to promote and elevate our calling. A line between this type and the unscrupulous builder should be clearly drawn before the public, and the results will soon impress us with the advantages of this Code of Ethics.



Pres. John Trainor, of Baltimore, Md.



Treas. Geo. C. Schroeder of Grand Rapids, Mich.



Secy. I. H. Scates of Baltimore, Md.

New Officers for 1916 *of the National Association of Builders' Exchanges*

A proper Code of Ethics will give higher caste to our calling, and improve our members in many ways. We found the progressive and fair-minded architects, the owners and business interests of the nation with us on "Contract Reform," and I am confident they will assist in the remedy of these unfortunate disabilities and unnecessary costs imposed on building.

At the present time considerable thought, experience and expert advice are being directed to manufacturing efficiency. It is a very important problem to manufacturers that they not only consider the actual manufacturing problem but at the same time give equal thought to the questions of what is fair and unfair in representation of merchandise, sales, competition, errors, collections, etc., and many of the other elements necessary to the conduct of a fair and successful business that lie beyond the confines of actual labor and material. These are wisely handled by most all other branches of commerce through organization. Experienced business men attach a great deal of importance to these phases of their business, then why should not the builder give this commanding matter the attention and consideration it deserves.

Your interests as individuals are generally parallel and identical; however, being a compound organization, there are times when the interests of the component parts are in opposition. The resultant condition often produces a very serious situation in our organization. Discipline and well considered actions are required for

the proper conduct and settlement of these perplexing problems. A full and just consideration of the rights of all interests with fair and equitable intentions must govern and determine our policies on this very important phase of our business.

How to Avoid Possible Rupture of Relations

Unless wisdom and equity are rightly adhered to in their settlement we are likely to permit or bring about differences and possible rupture. Individuals or organized interests who are in opposition to us and who desire to arrest our progress and defeat our purposes, realize that this is our most vulnerable point of attack, consequently at times we have to contend with these antagonistic elements, which bring about dangerous internal dissensions by misrepresentation, distorting of facts and conditions, and many other irritating methods. This strategy, often not fully understood by our members, frequently causes unnecessary differences between general contractors, sub-contractors, material dealers and manufacturers. Sometimes this attempt to center our attention on internal matters of this nature has a strong and frequently successful tendency to take our attention from dangerous external matters that are vitally opposing our success. This proceedure has been noticeable in certain localities, in our campaign for contract reform. Any such attempt to destroy our efficiency as a unit should be avoided and promptly eradicated. I desire to warn you to be ever alert, and guard against such disasters brought on by external force, by influence within our organization.

Building Business Prosperous

I am convinced from the information I have received from our local associations that the building business of the nation is now entering an era of prosperity never before equaled. In the execution of this volume of business that is now at our door, we should realize our duty to the public and avoid the burden of unnecessary labor and material.

It is our duty to give the public skilled and economical service. We are generally a factor and not a producer, usually providing in our price for all inherent and contingent costs—consequently the great burden of superfluous cost and loss which has always been abnormal must enter into the owner's investment.

Under the head of unnecessary loss we find exorbitant and wasteful material and labor conditions and costs, burdensome building codes, antiquated contract provisions, allowances for indefinite descriptions and provisions in specifications, disputes between various organizations and crafts, and many other extravagances. The interest accumulating yearly upon this excess investment forced upon the consumer makes this supercost a sum beyond the sphere of human comprehension, and emphasizes and brings out the necessity for strict justice in adjusting all labor and material costs and conditions. This is an obligation imposed upon us which we should properly recognize in this era of approaching prosperity.

Relationship Between Contractors and Sub-Contractors in Bidding

Regarding the question of the relationship between contractors and sub-contractors in bidding, I sincerely hope you will, in discussing and settling this question consider the rights of all, exercise diplomacy, equity and discipline, always remembering that we necessarily are a composite organization and that all its integral parts are entitled to liberality in judgment of their position and acts.

There are many serious questions that will come before this convention for consideration and determination, such as Quantity and Quality, Survey, Ethics in Bidding, Methods of Raising Funds for the Conduct of the Organization, and many other important matters. I am confident you will solve them to the best interest of all concerned.

I wish to express my appreciation of the great assistance rendered the Association and myself by J. M. Vollmer, our worthy and efficient secretary. These two years of labor by him in our behalf should be recognized and appreciated by every member of the Association; it is seldom we find a man so devoted and interested in his work. Our success in the past two years is very largely due to his capacity and experience so loyally and industriously applied.

Secretary and General Manager in One

During the year I visited an exchange whose secretary had the title of Secretary and General Manager. I was impressed with the accuracy of this description, as our secretaries very largely contribute to the management of the Exchange. The success of the National Association is due largely to the work of the secretaries of our affiliated associations. I wish to extend the thanks on behalf of the Association and myself for their earnest endeavor to promote our interest.

The address of I. H. Scates on "Organization and Co-operation" before the Michigan builders' State meeting recently is a masterpiece that you should all read and study. His years of experience, his labor devoted to our welfare, and his keen perception are shown in this splendid article.

At the close of this convention my term of office ceases, likewise my membership in this association, as my investments and interests are no longer identified with the building business, but are involved in a manufacturing plant that requires my attention.

Classification of Architects

In retiring I desire particularly to call your attention to one matter, and I hope you will consider it very seriously, as I think this largely influences your future success. I refer to "The Classification of Architects." Though people understand there are doctors and quack doctors, lawyers and shysters, and so on through all trades and professions, yet we generally permit the people to believe that there is no distinction between architects.

This situation is unique, and is no doubt brought about by our past subserviency, and our present enforced silence and submission in localities where the new contract documents are not in use. This of course results in the builders being forced to hold themselves in awe, on account of business diplomacy, and suppress their true opinions regarding the methods of this type.

It appears to me that it is our duty to the public and ourselves to use sterner methods than those of the past year and turn the full light of publicity upon architects who refuse to use the new Documents, and who are still clinging to what Mr. Sturgis designates as "comfortable blanket clauses under which the ignorant and incompetent architect seeks to protect himself." Proper attention on our part to these self-indulgent architects will soon form a clear line of demarcation, which will be readily recognized by an owner who is about to employ an architect. We should always make clear to the public and the owners the unnecessary expense and delay this method adds to the cost of the improvement. This type should be subjected to merciless public criticism and legal regulation. The reason for such action is not far to seek. You may just as easily imagine Nero being subjected to an intelligent criticism by the sycophants surrounding his throne as to expect an architect of this class to be criticized by a building fraternity which he has the power to make or break.

This is no abstraction, but a frequent condition, and there is not one man within the sound of my voice who cannot immediately summon up instances where the ill will and the oppression of an architect of this type have been invoked by a frank criticism made without thought of malice but dictated by a sincere desire to prevent the squandering of the owner's capital.

The New Policy

I say to you that such a situation is intolerable, and unless you appreciate the truly revolutionary character of our new policy and unless you realize that the builder is placed upon a new plane of equity and dignity and that our calling has been rid of the incubus of demoralizing subserviency to this method, you will have lost the fundamental keynote of our work.

Having bound ourselves together with the strong ties of our organization and having united our experience and acquired the strength and influence as a unit necessary for guiding our deliberations, determining our policies and enforcing their execution, we should now proceed to the proper regulation of such current matters of our business as will accrue to our common benefit, without imposing any burden or hardship upon anyone, always having uppermost in our thoughts the right of all others, and never permitting personal advantage to interfere with the high aim of our calling.

The delivery of this stirring address, voicing as it did the sentiment of the very best elements in the building industry, was received with thunders of applause from the attending delegates who followed every declaration of principle with the keenest interest.

Wednesday Afternoon Session

The afternoon session was given up to reports of committees and an address by Richard Ferge of Milwaukee. One of the most interesting features of this session was the report of the Committee of the Whole covering comments of delegates as to general conditions existing in various parts of the country.

The Theater Party

In the evening the center of the stage, so to speak, was held by the "Builders' Exchange Minstrels" at Aubaugh's Theater, which was well filled with delegates and friends. The show was "put on" as one of the attractions of the Builders' Convention and the parts were played by amateurs and everyone shared in the glory. E. Claire Urban was the director, J. E. Duggen the interlocutor, Arthur P. Pierce and W. A. Marshall the ends. In the second half of the program Mr. Pierce gave a capital imitation of Bert Williams and his famous game of Pantomime Poker. During the intermission the audience amused itself by sending up toy balloons. The Indianapolis delegation distributed a headgear of Oriental appearance with "Indianapolis 1917" emblazoned thereon.

Thursday Morning Session

On Thursday the feature of the forenoon session was an address by James A. Emery of Washington, D. C., who took for his topic the establishment of an American merchant marine and made an urgent plea for the creation of a good system of carrier ships flying the American flag. Speaking extemporaneously, Mr. Emery urged the builders to study the interests of one another and to co-operate one with another, citing the fact that the building industry was the oldest of all and for that reason should be the strongest. He briefly traced its history back to the days of the first man who provided shelter for himself.

He referred also to the unsatisfactory laws and rules which existed not only in the various organizations of the country, but in every city and State. He mentioned the great number of unnecessary laws enacted in the last few years and pleaded with members of the Builders' Exchanges throughout the land to study these conditions and be guarded in what they do.

President Lewman then introduced S. B. Detwiler, representing the National Lumbermen's Association, who delivered an address on behalf of that organization, pointing out that the lumbermen were willing and anxious to establish a system of co-operation with builders with a view to giving the best service possible.

Report of Various Committees

Following this address the report of the Field Commissioner was read by Benjamin K. Nausbaum of Philadelphia. He stated that during his activities and investigation during the past year he had learned of the membership campaigns which had been inaugurated and of the many new members who had been secured by various builders' exchanges throughout the country. He suggested that a permanent information bureau be established in connection with each of the builders' exchanges affiliated with the National body.

The report of the standing committee was next submitted, and J. A. G. Baddorf of Kansas City read the report of the labor committee. He stated that during the year there had been a number of serious strikes in the building industry, but all had been settled by arbitration.

At this point of the proceedings the convention was informed of what had transpired during the executive session held the day before. The principal work was the formation of a policy governing the official publication of the association.

The committee on Quantity Survey recommended a further investigation along the line indicated and expressed the opinion that constant communication with the American Institute of Architects should be maintained throughout the year relative to the recently adopted Contract Documents.

At 1 o'clock in the afternoon the visiting ladies were entertained by the management of the Fidelity & Deposit Company, the invitations to the entertainment having been extended by former Governor Warfield.

Thursday Afternoon Session

The principal business of the afternoon session of Thursday, Feb. 24, was the election of officers and Board of Control for the ensuing year. The result of the voting was as follows:

Officers for 1917

President—John Trainor of Baltimore, Md.
First Vice-President—H. K. Cochran of Pittsburgh, Pa.
Second Vice-President—Henry Otis of Detroit, Mich.
Treasurer—George C. Schroeder of Grand Rapids, Mich.
Secretary—I. H. Scates of Baltimore, Md.

Board of Control

C. J. Kelly, New York, N. Y.; D. A. Farrell, Atlanta, Ga.; Franklin M. Harris, Philadelphia, Pa.; Harry I. Wood, Louisville, Ky.; C. A. Dubel, Sioux City, Iowa; R. L. Watson, Columbus, Ohio; C. C. Pierson, Indianapolis, Ind.; D. C. McChord, Dallas, Tex.; Ralph McLeran, San Francisco, Cal.; Henry Ferge, Sr., Milwaukee, Wis., and Perry W. Ruth, Norfolk, Va.

The newly elected officers were then installed,

after which suggestions were offered for the development and extension of the organization.

Mr. Lewman an Honorary Member

A pleasing feature of the convention was the election of retiring President H. L. Lewman to an honorary life membership in recognition of his untiring services during the two years in which he held the office of president. During this time he was able, with the assistance of Secretary J. M. Vollmer, to increase the membership of the organization 175 per cent, making it not only one of the largest commercial organizations in the world, but establishing it as a most useful vehicle for advancing the interests of all those engaged in the business of building construction.

Place of Next Convention

The contest for the place of holding the 1917 convention was most spirited, but Atlanta, Ga., was finally selected, the first ballot showing that city to have secured 197 votes, Detroit 191 and Indianapolis 168. Two or three other cities had scattering votes. The next ballot was almost as close, but finally Detroit and Indianapolis withdrew in favor of Atlanta, and a unanimous vote was recorded.

The Ball on the Roof Garden

The entertainment features of the convention were concluded on the evening of Thursday, Feb. 24, with a ball on the roof garden of the Hotel Emerson, which was a fitting climax to a succession of pleasant events, and it is hard to say whether the Baltimore hosts or their out-of-town guests had the better time.

Trip to Washington and Annapolis

On Friday, Feb. 25, the delegates and ladies to the number of about 200 were the guests of the Builders' and Manufacturers' Exchange of Washington, D. C. The trip from Baltimore was made by special train over the Baltimore & Ohio Railroad. Secretary Charles E. Welsh of the Washington Exchange was in general charge of the trip, and naturally he was a very busy person about the Hotel Emerson on the day before, gathering together as many delegates as cared to make the trip. Upon arrival in Washington the visitors were taken on an automobile tour of the city, then entertained at luncheon and afterward were received by President Wilson at the White House.

On Saturday, Feb. 26, the delegates and ladies visited historic Annapolis, and were given a reception at the Capitol by Gov. Emerson C. Harrington of Maryland. Following a luncheon at Carvel Hall there was a visit to the United States Naval Academy, and then came the return to Baltimore.

A New Fourteen Story Hotel

Plans have recently been filed in the Borough of Manhattan, New York City, for a fourteen-story apartment hotel to occupy a plot 40 x 100 ft. in West Sixty-ninth Street, and cost $260,000. The plans by Architects Schwartz & Gross, 347 Fifth Avenue, were the first filed which comply with the new Building Code as regards light and ventilation, which went into effect March 14.

Conference of Secretaires of Builders' Exchanges

The day before the members of the National Association of Builders' Exchanges went into session the secretaries of many of the affiliated bodies held an all-day session and were the guests at luncheon of the Builders' Exchange of Baltimore. The deliberations of the body were presided over by Charles A. Bowen, the genial secretary of the Builders' and Traders' Exchange of Detroit, while A. H. Shank, the popular secretary of the Grand Rapids Exchange, acted as secretary.

The sessions were largely taken up with a discussion of a number of important phases of exchange work, and among the questions were several on "Legislation," "Labor," "National Organ," "Code of Ethics," "Committee Work," "Policy of Secretaries' Conference," "Sociability," "Co-operation, and Reciprocity," "Collection of Dues" and "The Field."

The secretaries of Exchanges in attendance at this conference included the following:

Charles A. Bowen of Detroit, Mich.
A. H. Shank of Grand Rapids, Mich.
I. H. Scates of Baltimore, Md.
C. B. Pitt, Assistant Secretary of Baltimore, Md.
Ed. Walters of the Master Builders' Association, Baltimore, Md.
Samuel B. Donnelly of New York City.
H. J. Mahon of Rochester, N. Y.
Howard Faust of Reading, Pa.
J. D. Stringer of Johnstown, Pa.
Vernon J. Dietz of Johnstown, Pa.
Henry J. Cohlgraff of Chicago, Ill.
E. M. Craig of the Building Contractors' Association, Chicago, Ill.
Charles F. Weltz of Cincinnati, Ohio.
A. A. Weingarten of Cincinnati, Ohio.
Paul J. Harvey of Youngstown, Ohio.
Frank G. Boyd of St. Louis, Mo.
J. M. Vollmer of Louisville, Ky.
Lee Parrish of Nashville, Tenn.
J. H. Snoddy of Chattanooga, Tenn.
Fred R. Stair of Knoxville, Tenn.
C. P. Massard of Des Moines, Iowa.
P. A. Bendfeldt of Richmond, Ind.
John Hauck of Indianapolis, Ind.
Oswald H. Albricht of Milwaukee, Wis.
A. V. Stein, Assistant Secretary, Milwaukee, Wis.
Benjamin K. Nusbaum of Milwaukee, Wis., Field Secretary of the National Association of Builders' Exchanges.
V. R. Gould of Omaha, Neb.
Clark Shelly of Omaha, Neb.
Philip Williams of Winston-Salem, N. C.
Dan Carey of Atlanta, Ga.
George F. Wadsworth of Norfolk, Va.
Charles E. Welsh of Washington, D. C.

Secretary Scates of the Baltimore Exchange and General Commissioner of the national body, urged the establishment of a "National Organ" and the matter was taken into convention proper with a recommendation from the conference that such a publication be launched.

North Jersey Master Builders' Association

Leading builders in Hudson County have recently formed an association, the objects being to promote the general welfare of builders and contractors. It is known as the North Jersey Master Builders' Association, with officers as follows:

President ..... Samuel H. Rubine
Treasurer ..... Max L. Baylene
Secretary ..... Samuel Horwitz

Regular meetings of the association are held on the first and third Thursdays of each month.



Some Built-in Conveniences for the Modern Kitchen

Features of Household Equipment which the Carpenter and Joiner Are Often Called Upon to Construct

By Charles Alma Byers

"A PLACE for everything, and everything in its place!" If there be any one room more than another to which the average housewife wants to apply this rule in her home, it is the kitchen. As every woman knows, it is difficult enough to keep this room "in order" when conditions are at their very best. Therefore, the kitchen should be as conveniently arranged and equipped as possible. And it is gratifying to observe that, in the modern home, wonderful progress is, at last, being made in this direction. This is particularly true of the bungalow, for no other type of home has brought about the introduction of so many built-in conveniences.

The accompanying photographs are especially interesting as showing some of the numerous built-in features with which the kitchen may be equipped. Some of these conveniences, in design, are quite simple and ordinary and some are truly unique, but all of them will be found to constitute particularly desirable auxiliaries, if space will permit of their being used.

Fig. 1 shows a section of ordinary cupboard and drawer space, but special attention, however, is invited to the nine small spice drawers that occupy the center of the picture. These drawers are so arranged as to occupy an almost square space at one end of the counter-shelf that here divides the cupboard space of the kitchen into an upper and a lower section. The space occupied is approximately 15 in. high by 18 in. wide, and the drawers are about 10 in. long. The sides and the bottom of each drawer are of tin, and the ends are of wood, while the knobs are glass. The drawers may be drawn entirely out if desired, so that they may be used at the work table or elsewhere. A set of such drawers for spices costs very little and are particularly convenient.

Another of the pictures Fig. 2 shows a still more desirable feature in this line—a built-in re-



Fig. 1—The Nine Little Spice Drawers a Feature the Housewife Will Appreciate

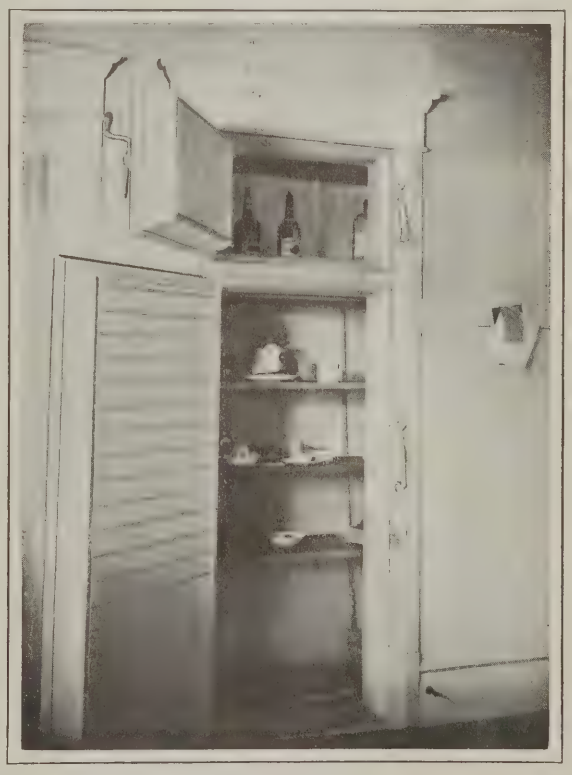


Fig. 2—Open View of a Well Designed Built-in Refrigerator

Some Built-in Conveniences for the Kitchen

frigerator. Being located in the kitchen, it is especially convenient, and, extending from the floor to the height of the ordinary door, it is unusually roomy, being nearly 36 in. wide by 20 in. deep, inside measurements. It is equipped with one large door below and a small one above, each about 6 in. thick, the center being filled with sawdust. The lower compartment is provided with three shelves, constructed of wood strips, and the upper section is used to hold the ice. The piece of ice may be inserted either through the door in the kitchen or through a small door opening onto the rear porch, and a drain for the water from the melting ice is naturally provided. An ice box of some kind is virtually a household necessity, and one of the type here shown is never in the way and is perhaps as inexpensive as any other kind, size considered. To



Some Built-in Conveniences for the Kitchen—Fig. 3—A Well-Designed Closet for Storing Cooking Utensils

make them air-tight, the doors are edged with canvas.

Fig. 3 shows a well-arranged closet for cooking and baking utensils, tins, pans, lids, etc. The interior walls are provided with numerous headless nails on which to hang the different articles, and the inside surface of the door is equipped with four well-designed racks or trays for holding the articles which cannot be hung on the nails. The closet is sufficiently roomy to hold practically all the necessary articles of this kind.

In Fig. 4 is shown a collapsible table which can be used as a work table or a dining table for the servant, and when not in use it is entirely out of the way. This one is 36 in. long by 24 in. wide. It is fastened to the wall by two hinges placed along one of its longer edges, and a hinged iron brace underneath the center enables its being raised or lowered at will. When lowered it hangs so close to the wall as to take up no room whatever. A table of this kind can be added to the equipment of almost any kitchen, and will cost comparatively nothing. A stool of the kind here shown is, of course, a desirable adjunct thereof.



Fig. 4—A Collapsible Table of Great Convenience

In Fig. 5 of the pictures are shown three flour bins of the more common type. Each of the bins is nearly 2 ft. deep by about 1 ft. sq. at the top, inside measurements. The board which forms the back, however, is set at a slant, so that the dimensions at the bottom are approximately 12 by 3 in. The bins are fastened with a hinge at the bottom, and by pulling outward on the knob at the top they are opened to access. They are held in such manner that they can be drawn outward only far enough to expose the opening. The bins occupy the space beneath one end of the sink drain-board, and immediately above them is a disappearing bread board of the usual type.

There is shown in Fig. 6 of the pictures a combination of conveniences. Occupying wall space approximately 3 ft. wide, extending from the floor to

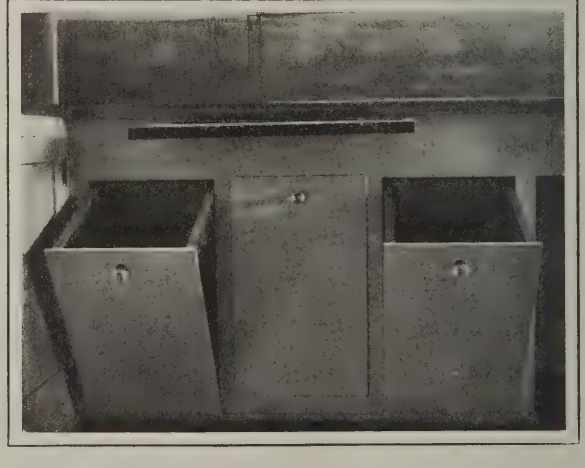


Fig. 5—Three Flour Bins with Disappearing Bread Board Shown Above and Partially Drawn Out

the ceiling, it would be extremely difficult to more compactly group so many very desirable features than is done in this arrangement. Placed at a height of 33 in. from the floor is a deep counter-shelf, and immediately beneath it is a bread board, 24 in. wide by 18 in. deep, which may be pushed

back when not in use. Below this disappearing board, on one side, are two flour bins, and, on the other side, are respectively an ordinary drawer divided into spice compartments and a cabinet for lard and other things, requiring considerable space, that may be needed in cooking or baking. The flour bins, or drawers, are lined with tin, curved in such manner as to make the center deeper than the front and back ends; and the door of the cabinet is equipped with a sort of shelf, near the lower edge, with a suspending brace at the edge nearer the hinges, on which rests the jar of lard, and which is swung outward from the cabinet by merely opening the door. Immediately above the counter-shelf are two shallow shelves, used for extracts and other cooking or baking ingredients, which are either exposed to view or concealed by respectively raising or lowering a sliding door, the weight of



Fig. 8—The Ironing Board of the Built-in Type

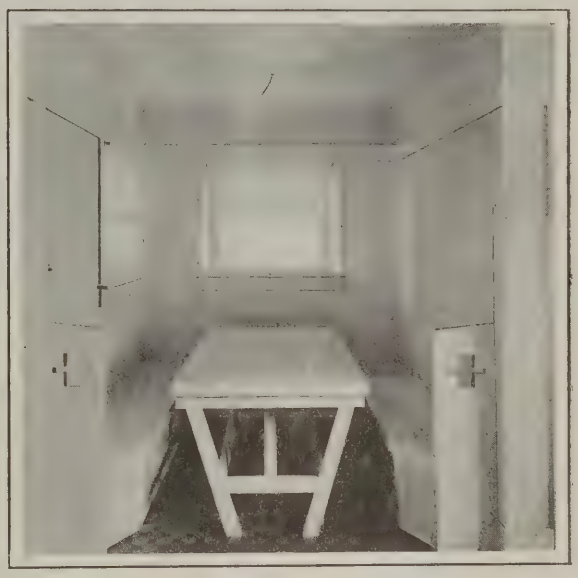


Fig. 9—A "Dutch" Breakfast Corner



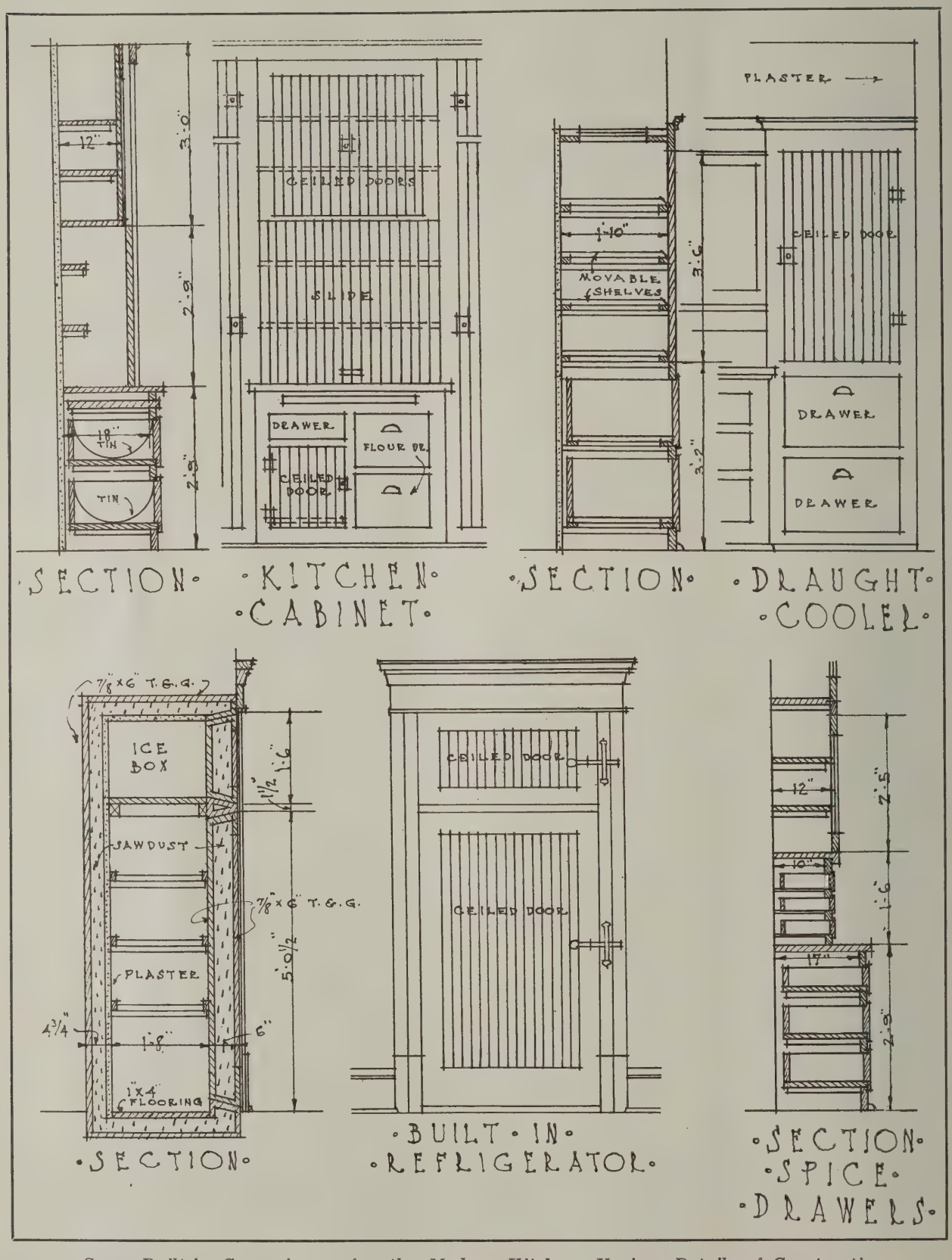
Fig. 6—A Combination of Conveniences

Fig. 7—A Draught Cooler Which Serves an Excellent Purpose as a Feature of the Kitchen Equipment

Some Built-in Conveniences for the Modern Kitchen

which is counterbalanced in such manner as to cause it to remain in any position desired. And above the center portion is still another section, which is occupied by a sort of cupboard space, equipped with a pair of ordinary hinged doors. shelf, the woman will find that nearly everything required in cooking or baking is so conveniently at hand that she will not be compelled to rise from her chair.

A draught cooler, quite indispensable as a kitchen



Some Built-in Conveniences for the Modern Kitchen—Various Details of Construction

The front surface of this section is set into the wall far enough to enable the raising of the sliding door of the middle section without causing interference. By seating herself before the counter-

feature, is shown in Fig. 7. This cooler has openings at the bottom and the top, to assure a cooling draught, but in other respects it differs quite a little from the ordinary kind. In the upper portion are

four shelves, which are constructed of wood strips instead of wire screen; and in the lower portion are two large drawers, the bottoms of which are also constructed of wood strips. These open wood frames give the maximum of stability and at the same time permit a free circulation of the draught.

If you would always have your ironing board in its proper place you will want one of the built-in kind. Fig. 8 of the accompanying illustrations shows such an arrangement. This board, which is 12 in. wide and 5 ft. long, when not in use, folds up neatly into its own special cabinet, and, by closing the door, is concealed from view. The cabinet end of the board is equipped with tiny knobs which fit into slides or grooves in the sides of the cabinet. The brace is fastened to both the board near the center and the bottom of the cabinet by hinges. The board is held stationary at a certain level by the knobs slipping into small notches in the grooves. There are several ways of designing built-in ironing boards, and others will perhaps readily suggest themselves. One common plan is to fasten the board at one end to the interior of the cabinet with hinges, and then fasten to the underneath near the other end of the board a hinged leg, which, by raising the board upward into the cabinet, folds alongside the under side of the board.

The last of the illustrations Fig. 9 shows still another very desirable kitchen feature—a Dutch breakfast corner. These have come into considerable favor during the last few years, especially with bungalow builders, and have proven very convenient for serving the morning meal in the small home and as a dining place for the servant or for the small children in the larger home. The spaces devoted to such corners are of various dimensions. A space 5 ft. wide by about 4 ft. deep, however, will prove quite sufficient in most cases. The table in such instances will be about 3 ft. 6 in. long by about 2 ft. 6 in. in width. The seats are invariably stationary, but the table may be constructed so that it can be removed from the corner, in order that it may be temporarily used for some kitchen emergency, or so that the corner may be the more easily cleaned.

The kitchen features here suggested are practical and the cost of installing them will be found to be very little as compared with the convenience that they afford. They help very materially toward making kitchen work more pleasant and considerably lighter, and every housewife will find them a source of much delight. The ones here illustratd are merely intended as suggestions, for in making adaptations it will often be necessary to make certain changes to suit the particular kitchen in which they are to be used.

Variation in Builders' Estimates

Some of the Differences Noted in Connection with Actual Bids on Contracts for Construction Work



IT is a well known fact that in the competition for work, builders' estimates frequently vary to a surprising extent, and some of the results of this competition are set forth in the Monthly Letter of Secretary Sayward of the Master Builders' Association of Boston. The following extracts cannot fail to be read with interest.

"On a bank alteration job, an alleged ambiguity in specifications led to one contractor's success. He found, after he had expended about $100 on the job, that the architect was expecting him to do things he had not estimated to do. Inquiries easily established the fact that four other bidders had all included the items in question—the successful one had not. Owner, architect and builder each paid one-third of the cost of the error, about $300 each. But what of the unsuccessful bidders?

"On a house some distance from Boston, about ten years ago, three bidders figuring about alike were above the price set by the owner for his expenditure. The architects, a leading firm, told him he could cut his requirements, or could get another series of bids from men doing a lower grade of work. He chose the latter alternative, and his house was built within his price.

"On a job of interior finish, some distance from Boston, three or four years ago, three Boston bidders doing a similar high grade of work were within $1,000 of $137,000. The work was let for $92,000 in another city, and, even after adding on an acknowledged error of $25,000, the successful bidder would still have been 16 per cent under the Boston men. None of the Boston men would have made over $15,000 on the job.

"On a small job in a small town, five figures were $9,500, $9,300, $9,000, $8,900 and $6,600. What is obviously within a few hundred dollars of the right price? The owner was delighted at the low price. Why should he have been?

"On a recent bank alteration job, with six bidders, four were eliminated after the bids were in because they were not local men. Refiguring of cuts was done by the other two, and one dropped one thousand dollars more than the value of the cuts (finding he had to do so), and although still high was awarded the job because he was a depositor in that bank, while the other was not.

"On a job in 1912, where cuts were figured, one competitor dropped five hundred dollars where twelve hundred dollars' worth of stone mason's foundation work was changed from stone to concrete in location where materials for either were easy to get. Cuts offer a splendid opportunity for one man to drop by another, and win by, in fact sub-

mitting a second figure when he surmises his first one was a little too high.

"Recently, subcontractors for painting figured so cleverly that the lowest on a job was $650 and the highest $2,180, with enough good men together around $1,500 to show that probably there was the right price. Some contractors figuring would use the low figure, others not wanting to must do so, or risk their chances of winning. This element is a common feature of competitive bidding.

"In September, 1915, a reputable Boston architect of a fairly large job stated that the owner had a fixed price set for his work, and that he had purposely selected a list of bidders commonly varying widely in price and in quality of result. From them he had chosen as good a man as he could, and come within the price established; and he said that he regretted not being able to choose a better man.

Effect of Guarantee

"Two or three years ago, an owner who formerly let a contract to a bidder about 20 per cent under a group of competitors, and who was not satisfied with the results obtained, strove to mend matters upon some further work by a most stringent three-years' guarantee—the strongest document of the sort ever seen by Boston contractors who estimated the work. This document was the work of the owner, not of his architect. Here was a direct intent to make a silk purse out of a sow's ear by legal verbiage—followed, if needed, by legal procedure.

"A few years ago a hard-fought job near Boston was awarded to the contractor fourth from the bottom in a list of six bidders. Later, he was told the owner always intended him to do the work.

"Recently, on a job a few miles from Boston, the owner told one bidder that he wanted him to do his work and that he would pay a preference, but not a large one. The job went to another man, who by the use of two subcontractors, whose bids the preferred man had but did not care to use, saved more than the difference between the two figures.

"In 1915, a job near Boston had four bidders within a fifteen-hundred-dollar variation figuring around $62,000, while a fifth was about $50,000 and won the award. What will happen to the winner and to the work he does?

" 'Time is of the essence of this contract.' How often this is written! A year ago a large job was let to be completed Aug. 15, 1915. On October 1, 1915, it was nearly done. A contractor's promises for time are commonly taken in preference to an examination of his performances.

The Forfeit Clause

"Not long ago the wife of an owner told a friend about to build to put a forfeit clause into his contract, for the reason that it could always be collected, for some reason or other, and was a good way to save on a contract.

"Recently an architect asked for two bids from general contractors. With one of these the architect was in league to the extent of giving him competitor's prices in order that he might bid under them—and the other contractor knew it—and knew the owner. After the bids were in, he approached the owner thus: 'Now, Mr. Blank, I have a grudge against Smith, my competitor, and I can work it out and show you how to make a thousand dollars if you will give me fifty dollars.' Mr. Blank agreed. 'I will go to your architect, claim I made a mistake, withdraw my bid, put in another one, one thousand dollars lower; your architect will tell his friend, who will do the same thing. You will make a thousand, and can then send me fifty.'

"On a job of plumbing worth $750 a low bidder was awarded the work at $475. Recently, two years later, alterations were made, and the hot and cold water piping, specified "iron-sized brass"—a good brass pipe—was found to be gilded iron.

"The above cases, excepting one or two, are typical instances of occurrences which are very common—so common that they would not be worth reciting were our readers only those familiar with building operations. The cases quoted are not garbled or exaggerated, but are normal, and are all actual happenings."

The Spirit of the Country Home

Sometimes there comes to every one of us the overwhelming desire for a home in the country. If the call is unheeded, one of the finest and most satisfying joys that life holds will have been missed.

It is easy to establish a home in the country, and it matters not so much where one builds. It may be by the sea; in the wooded hills or on the plain, and in almost every instance will be found many generous gifts of nature that will serve the builder of the country home to make the house a very part of the spot on which it stands. For the form it will take there is a wide choice, says Noble Foster Hoggson. Splendid advancement has been made in the design of the country house. The fortunate seeker for a home in the country, however, is the one who finds, hidden away from the beaten track, an old homestead which may be remodelled without marring its fine simplicity, its real charm.

No fairy is needed to bring the dream of a real country home into being, when once the place has been found; no magic is brought into play. The owner need only find a designer, who is at the same time a builder, and who can put himself in the place of the owner in spirit as well as in the practical working out of the scheme. He will begin with the owner at the beginning, and take upon himself the whole responsibility, because all necessary elements work more harmoniously and co-operatively under a single direction and management. A home constructed in this way has no bickerings or misunderstandings built into it, and holds no disappointments, but on the conrtray brings a sense of satisfaction that grows with the passing years.

Code of Lighting for Factories

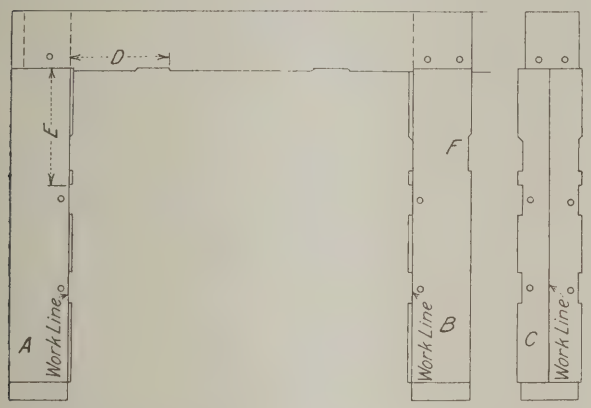
As an aid to Public Service Commissions, State and Municipal and Industrial Commissions, Factory Boards and other bodies taking up questions of legislation as related to factory and mill lighting, the Illuminating Engineering Society has prepared a Code of Lighting for factories, mills and other work places readily available for transforming into legal orders. This code was discussed at an open meeting held in New York City on March 14.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Defective Bracing

From Builder, Clinton County, New York.—For a long time I had been puzzled to know why good framers had one brace loose and all the others in the bent very tight. I finally discovered a mire



Defective Bracing as Described by "Builder"

hole they fell into. The sketch is drawn to point out the failure to readers who may be framing. The danger is as great in sawed as in hewed timber. Also the work line is placed on those posts for "McM's" benefit as well as for those who have never seen it in framing hewed timber.

The distances *D* and *E*, Post *A*, are equal; the gains are all sunk to the work line to which the tenon is sized. On post *B* the sizing and superfluous timber are on the left face; the right hand face is worked to the hew line; now if a brace is put on the right face at *F* and the run measured from the mortise as at *D*, that brace will be too short by the depth of the seat *F*.

Again, if *B* is sawed or planed timber the mortise would be the full width of the timber and if the run of the braces are taken as at *a* both braces will be short.

Now it is clear that the rise of the brace must be taken from the housing of the plate or post and the run must be measured from the work line which limits the depth of the gains even if you don't put the work line on. The post *C* is a hewed center post 10 x 10 in., but much larger; the work line is placed in the center, the tenon sized to 9 in., the bottom of each gain is 4½ in. from the center line. Most framers size the center post all from one side and get one loose brace.

Question in Floor Construction

From W. K., Highland Park, Ill.—In regard to the question of "L. S.," Dixon, Ill., concerning the use of ⅜-in. oak flooring in a church laid over a good level sub-floor with felt between I desire to offer a few comments. I have laid a considerable quantity of this in 1¾-in. and 2-in. widths with square edges and have found that it makes a very good and substantial floor. These results, however, are obtained by using quarter sawed material, exercising great care in laying the floor and then keeping it properly finished. The plain sawed material is apt to buckle badly when it becomes damp and it will warp and show cracks; therefore it is not suitable for thin floors.

From Contractor, Moffittsville, N. Y.—Regarding the query of "L. S.," Dixon, Ill., will say "Don't do it." It will be a botch job in less than a year. Flooring that thin is useless anywhere except in small rooms of dwelling houses. It will be dearer than 13/16 in. before the job is done. Get a high grade article, bored, tongued and grooved or doweled at the ends. It will cut but once in each course, and the piece cut off will start the next course. Lay crossways over the old floor and 8d finish nails or 6d flooring nails will give a good job. Use a nail-set and do not pound the lumber. A bar of soap is a useful article on the job.

Construction of a Carpenter's Tool Chest

From S. D. Gratke, Cedar Falls, Iowa.—I am sending herewith a view of my tool chest which may possibly interest some of the readers of the



Construction of a Carpenter's Tool Chest

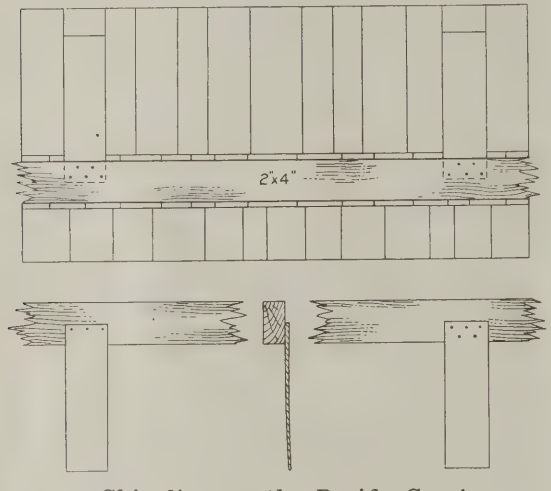
paper and also answer the needs of "C. R. W." who made inquiry in the February issue in regard to tool chest construction. I intend to make some

improvements in my tool chest just as soon as I can obtain information as to the best means of accomplishing it.

I have tried in the construction of this box to follow the idea of "a place for everything and everything in its place." The outside dimensions of the chest are 20 x 20 x 36 in. As will be seen from the picture, saws and squares are placed in the lid or cover. The front doors hold a set of chisels, a set of auger bits and a few other tools. In the large bottom drawer are the planes while the small tools are kept in the other drawers. The two bottom drawers extend to the back of the chest, while the others run only half way back, thus giving a recess in the rear of them for larger tools. I have very nearly a full set of tools, and while the chest is not sufficient to hold all of them it is heavy enough to handle.

Shingling on the Pacific Coast

From G. L. McM., Tacoma, Wash.—While the subject of shingling is being discussed I wish to register my objection to the "calked shoe" method



Shingling on the Pacific Coast

of work, though I know that it is quite generally practised. It is a case of sacrificing quality and durability to speed. It does not add anything to the excellence or durability of a roof to have from one to a half-dozen men tramping over it with spiked shoes. When one considers that *A* shingles—the grade most commonly used—are only "6 to 2's," that is six of them only measure 2 in. in thickness, and that loggers calks are from ⅜ in. to ½ in. long one does not need a "double million magnifier" to see that there is not much left between the bottom of the calk hole and the under surface of the shingle, to say nothing of the liability of splitting shingles in walking on them. The small spurs necessary to keep a seat such as "O. K." describes, from slipping, would not materially injure the roof however.

With the use of the seat described by "O. K." in the December issue, the 2 x 4 toe holds in common use here, and the gauge on the hatchet, a roof can be shingled with speed enough to satisfy ordinary demand, and the increased quality of the roof will, in my opinion, more than make up for the trifling loss of time. If the shingles are carried up and distributed before the shingling begins, and placed one bunch every 5 or 6 ft. each way, there will always be a bunch within easy reach of the shingler, and very little moving bunches out of the way or hunting extra bunches will be necessary and it is less work to properly distribute them in the first place than to move them about as required after the work of laying them is started. This is one of the numerous cases where the application of a little brains and foresight in planning the work in advance pays big dividends in time saved later on. More such planning would obviate the necessity of using injurious "hurry up" methods later on in order to make a profit on the job.

In inclose a sketch of the way to put on a toe hold such as I have mentioned, which is self-explanatory. It will be noticed that the shingles holding the 2 x 4 are nailed to the under side and that the toe hold is placed just below the butts of the next course of shingles, of which the shingles holding it become a part. When the shingling is completed the 2 x 4 can be raised a little and the shingles holding it sawed off even with the course, leaving the roof smooth and with no nail holes exposed to become possible leaks later on. Nothing thicker than 2 in. should be used for toe holds put on in this way, as if thicker material is used there is a tendency for it to roll under pressure of the feet and become loose with the result that a dangerous, if not fatal fall may occur. I once worked with a man who got a fall, resulting in a broken ankle that laid him up several months, from using a 4 x 4 for a toe hold. Care should be taken that the holding shingles are well nailed both to the toe hold and to the roof above. I have used this kind of a toe hold exclusively for twenty-seven years and never knew of one giving way where nothing thicker than 2-in. was used.

If shingles are nailed about ½ in. from the edge and care is taken to break joints not less than 1 in. there will be little danger that nails will come under the joint in the course above.

Repairing a Concrete Roof

From W. K., Highland Park, Ill.—Replying to the inquiry of "J. B.," Wyoming, Iowa, in the March issue of the paper regarding a leaky garage roof, I would suggest the use of a prepared roofing cement which can be bought at almost any tin shop or hardware store. The correspondent should see to it that the cracks are clean and dry, and then work the cement well into them so that it will firmly adhere. I have used this preparation for repairing roofs, gutters, tin decks, chimneys, etc., with good results.

From Builder, Redford, N. Y.—I am thinking that "J. B.," Wyoming, Iowa, has a job hard to discuss without giving more data. I have done concreting 18 degrees below zero. If such work is troweled it will crack and scale. Freezing does not necessarily cause cracking, as it may be due to shrinkage or settling of the lumber. The first thing he must do is to get up on the roof and examine it. He should have done this before he wrote. If there are disintegration areas they must be cleaned out, well wet and plastered over with cement mortar waterproofed with 5 per cent to 10 per cent of Maltha. If everything is sound and only cracks he may fill these with "Tarvia X.," a material used to fill the cracks in cement highways.

If the cracks are large, fine sand may be mixed with the Tarvia. After the cracks are well filled, the entire roof may be given a coat of Tarvia A applied at 170 degrees F. This material adheres firmly to concrete.

Scaffold Bracket for Asphalt Shingle Roofs

From W. M. Spalding, Elmira, N. Y.—In reading the article by E. H. Crussell in the March issue of The Building Age it has occurred to me that the bracket I am using for scaffolding on asphalt shingle roofs might possibly prove of interest to some of the readers of the paper. I am, therefore, sending sketches, Fig. 1 showing the bracket and Fig. 2 its application on the roof of a building.

Any blacksmith can make these brackets. We use ⅛ x 1¼ in. band iron. The two hooked notches or slots in the top of the bracket as shown in Fig. 1 are just large enough to work over an 8d wire nail

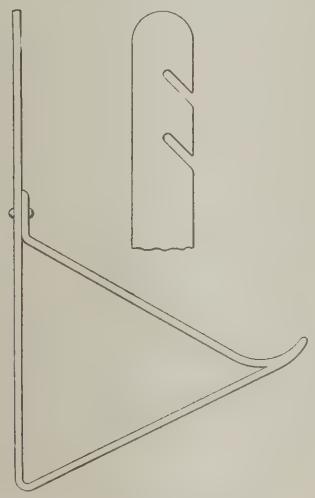


Fig. 1—Side View of Bracket with Plan of Upper Part Showing Slots for Nails—Scale one-quarter full size

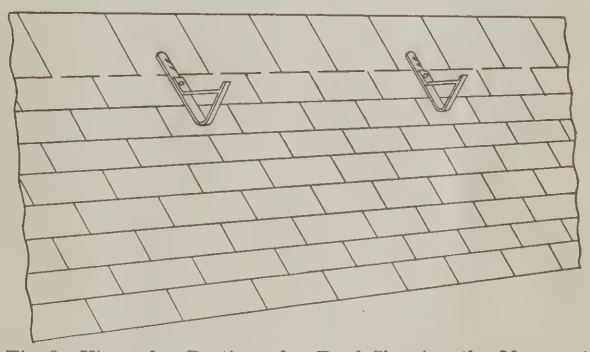


Fig. 2—View of a Portion of a Roof Showing the Manner in Which the Scaffold Brackets Are Applied

Scaffold Bracket for Asphalt Shingle Roofs as Described by W. M. Spalding

driven down tight on the iron. When through with the scaffold a tap on the bottom end with a hammer will unhook the bracket and it can be pulled out. The nails sticking out only ⅛-in. will never give any trouble. We have used these brackets on a great many roofs and find them to be very satisfactory indeed for the purpose.

Methods of Building Construction

From G. L. McM., Tacoma, Wash.—I concede that "J. P. W.'s" method of constructing a built-up sill might make a somewhat stiffer frame than the way I mentioned, especially if the studs were spiked to the edge sill as well as the flat one, but that would seem to necessitate setting up the frame before the floor lining was laid, which would be a disadvantage. Probably no one method combines the advantages of all, with none of the defects of any, and no doubt all our methods are modified by the conditions as we find them.

I do not think there would be any appreciable danger of the sills and superstructure parting company as he suggests, especially if, as is usual here, the walls are sheathed diagonally and the sheathing nailed to the sill as well as the studs.

In some respects there is an advantage in using studs of the full height of both stories, and I sometimes use that method myself. It has some disadvantages, too. Our custom here is to put down the floor joists and lay the floor lining, which can more easily be cut off flush with the outside of the frame than with the edge sill shown by "J. P. W.," then the 2 x 4 is nailed down and the stud nailed to the plate while spread out on the floor in sections as long as can easily be handled. Door and window openings can be framed in at the same time if desired, but that is not usually found desirable, and the walls and bearing partitions are raised in sections. These sections can be more easily handled with studs of only one story length than with full length studs, and the saving in time more than offsets the extra 2 x 4 used for sills. The second floor joists are then placed and the second floor lining laid and the process repeated. This method gives us a smooth floor to work on, which is much more convenient and safe than loose boards laid on the joists.

Another advantage, with us, of the one-story-at-a-time method as opposed to the full-length-stud method, is that our lumber comes to us direct from the saw-mill, and often there is no appreciable pause between the mill pond and the unloading of the lumber on the job. Consequently our lumber is usually wet or green, or both, and has very little chance to dry out or season before the house is finished and occupied. It is Douglas fir, and a fir joist 2 x 12 will shrink ½ in. in seasoning. If the framing is done as I showed, the walls will follow the shrinkage of the joists, while if full-length studs are used, and they are set on the flat piece of the sill, as "J. P. W." suggests, the base and other finish, being nailed to the studs, will part company with the floor, much to the detriment of the appearance of the completed job, especially if, as is usually the case, the shrinkage does not fully take place till the heating plant has been in full operation for some time, the painting and varnishing completed and the house occupied. I knew of one $20,000 house in which this was the case and the floor and floor mold dropped a full half-inch away from the base.

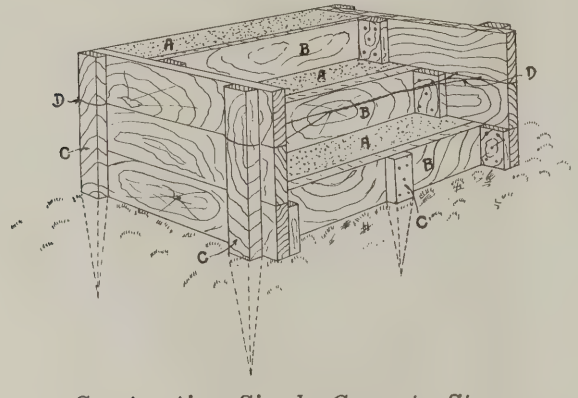
Will "J. P. W." kindly tell us why he prefers to have his sheathing on the inside of the wall rather than the outside? I have never been able to see any good reason for that.

I wonder if "D. P. B.'s" "Oregon spruce" doors are not really made of Douglas fir? Spruce is not considered good door material here, and as it is more expensive than fir, and as I do not know of any company making doors of that material while there are many makers of fir doors hereabouts, I am rather inclined to believe that the doors are marketed under a false name.

Our Pacific Coast spruce is about half way between New England spruce and white pine for hardness; is very susceptible to changes of humidity in the atmosphere, and is much disposed to roll up or become stringy under the plane or chisel, and is hard to finish without becoming fuzzy. Fir is known in some markets as "Oregon pine."

Constructing Simple Concrete Steps

From E. Edward Kurtz, Grand Rapids, Mich.—My attention was recently drawn to the article appearing in THE BUILDING AGE describing a method of building simple concrete steps, but as the information there given is in some respects in conflict with my own experience, I take the liberty of



Constructing Simple Concrete Steps

offering a short description of the method which I have found satisfactory for doing work of this kind.

First—Excavate the ground to the required area; the depth may be a foot or more, depending upon the nature of the soil. Good firm soil must be reached for the foundation. It is very important to have a good foundation and good drainage, for without these the concrete is liable to settle and crack. After excavation is completed, fill the space to a depth of about 6 inches with gravel, stone, broken brick or cinders, and then tamp compactly.

Second—The next step is to build the "forms." They may be made of almost any kind of lumber, so long as it is straight and free from knot-holes and slivers. It is always best to use two-inch material, or lumber of nearly that thickness, as the "forms" need to be rigid. Poor "forms" make bad looking concrete. Stock size lumber may be used in many cases. It is always better to complete the "forms" and brace rigidly before the concrete is placed. The drawing shows how "forms" are often built.

Here, *A, A*, are the 12-in. treads; *B, B*, the 7-in. risers; *C, C*, the 2 x 4-in. stakes, and *D, D*, is No. 12 wire.

Third—Now proceed with proportioning, mixing and placing. Use a 1:2:4 mixture—that is, to one sack of cement use 2 cu. ft. of sand and 4 cu. ft. of gravel or stone which is not over 1 in. in diameter. The quite common practice of using bank-run gravel directly is a poor one. It should first be screened and reproportioned, as the correct proportion of sand and stone is rarely found in the pit. The mixing, if by hand, should be done on a watertight platform.

First mix the cement with good, clean, coarse sand until a uniform color is obtained, and then add water until the mixture is mushy. Next, add the coarse aggregate and mix thoroughly. While placing the concrete, spade or trowel along the sides next to the "forms," so as to get the larger particles away from the surface. If this is carefully done, a smooth surface will be obtained. The treads, by sufficient troweling, can be made smooth, although they should not be smooth enough to be slippery. Good practice is to put a ¾-in. of mortar, 1:2 mix, on the treads.

Good judgment must be exercised in the removal of "forms" and the curing of the concrete. During warm weather the "forms" may be removed within twenty-four to thirty hours. In cold weather they must be left on much longer, as concrete hardens very slowly when the temperature is low. In hot weather the concrete should be protected from the direct rays of the sun and kept damp for a week or ten days.

The method here given is not the only one, but if it is carefully followed, steps that are permanent and attractive may be constructed.

Framing with the Steel Square

From G. L. McM., Tacoma, Wash.—It is to be regretted that a man of Mr. Barry's ability, and no one who has read THE BUILDING AGE for any length of time can doubt his ability, persists in what he must know are erroneous statements, and fails to see that there is more than one way of doing most kinds of work; also that methods which are correct for one way may not be correct for another way of doing the same kind of work. The bevels of jack-rafters against hips and valleys are not the same as the bevels of hips and valleys against ridges, as every roof framer knows, and the same figures on the square will not give the correct cuts for both, else why do framing squares give different cuts for the two? Why do framers ask for the proper cuts for hips against ridges? Neither will there be any such difficulty as he contends in the matter of fascias with my methods of framing.

The whole trouble seems to arise from the fact that Mr. Barry does not understand, or will not admit, that there can be any other way of doing work than the one he has learned. I understand his method of framing roofs, and with the exception of the contention that the same cuts can be used for both jacks and hips, his directions are correct for his method, just as mine are for my method. There is a difference in the framing of both valleys and hips, depending on whether they are to be backed and grooved or not. His figures are for the former, mine for the latter. I consider it unscientific and the mark of an inferior workman to do unnecessary work that does not add to either the strength or appearance of the finished job. And

backing hips and grooving valleys, except in rare and isolated cases, is such work. Of course, if his customers want their work done that way, well and good, and if he can do his work and put in more or less unnecessary time and labor and "get by" with it, that is a matter between his customers and himself.

Referring particularly now to his strictures in the March issue, I would say that obviously his lines A A of Figs. 1 and 5 in the October issue are correct *if the hips are to be backed,* but not otherwise.

Where the hips *are not to be backed* the length of the line A, Fig. 1, October issue, must be taken on the hip *one-half the thickness of the hip back from A, Fig.* 5 of the October issue, as shown in my article in the issue for November, 1915. Where the valley is to be grooved the same allowance must be made, with this difference, that the length of the line A, Fig. 1, October issue (on the common rafter)

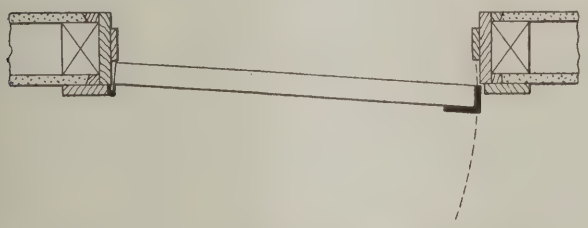


Fig. 1—Method of Finding Bevel for Edge of Door

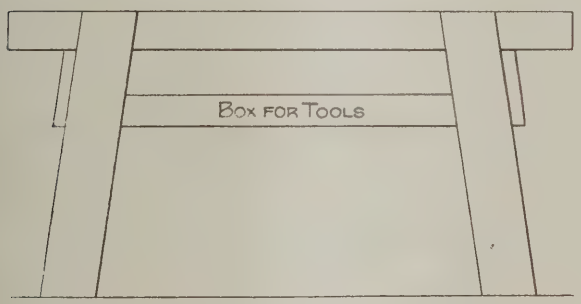


Fig. 2—Side View of Trestle with Box

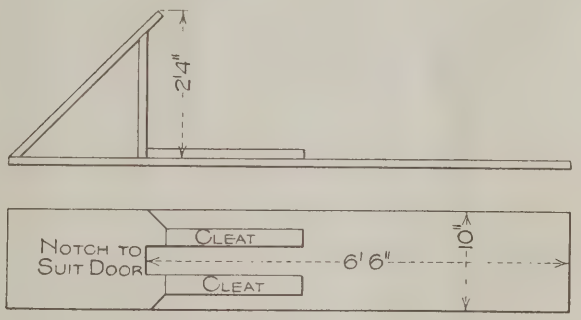


Fig. 3—Plan and Elevation of "Jack"

Fitting and Hanging Doors—Contributed by "J. C. G.," Philadelphia, Pa.

must be laid off on the valley *outside* the line A, Fig. 5, of the October issue, instead of *inside.* In other words, when the *hip is not to be backed* or when the valley *is to be grooved* the length of the line A on the hip or valley must be taken *where the edge of the hip or valley cuts the outside edge of the plate—not at the center of the hip or valley.*

It will be understood that I assume that the line A, Fig. 5, of the October issue is at the point marking the length of the hip or valley at the corner of the plates, which will mark the place the hip is cut while the valley will naturally be cut half its thickness longer.

Fitting and Hanging Doors

From J. C. G., Philadelphia, Pa.—I have read with a great deal of interest the various communications appearing in the Correspondence Department of The Building Age, and have obtained valuable information therefrom. Having read the article recently published on fitting and hanging doors, I thought, perhaps, the method of doing this sort of work which I use might interest the readers.

The tools and appliances are a jack for holding the door while jointing it and fitting the hinges, also a pair of trestles with a box fitted in between the legs to hold the tools, and at the same time serve as a handbox. I use a foreplane to joint the door and on hardwood doors I use a scraper plane to smooth the curly grain, a thin 2-in. butt chisel to mortise out for the butts, a gage, an automatic drill, a screwdriver and other necessary tools.

I first place the door on the trestles and measure the width of the door opening with a slide rule. I then plane or rip off the surplus wood from each stile so the door will go in the opening. I take the same amount off the top of the door that I took off the sides. I obtain the height and cut off the bottom of the door about $\frac{5}{8}$ in. from the floor.

The next step is to try the door and take off enough for clearance. The bevel I give the door is just enough to open clear of the jamb with the same joint as when the door is closed. I fit the butts on the door first and then place the door in the opening, marking the jamb for the butts. I mortise the butts on the jamb, put in one screw, hang on the door and then put in the remaining screws. If care is used in fitting the butts, the door will work well with very little adjusting.

I am sending a sketch, Fig. 1, of the way I find the correct bevel for the edge of the door, also sketches, Figs. 2 and 3, of the jack and trestle.

Hanging doors and fitting locks, I think, are about the most important work in connection with a building, for to become an expert it is not so much the method used as it is practice and experience.

I fit locks very much the same way as described in a recent issue by "D. P. B.," Redford, N. Y.

"Wrinkles" in House Building

From G. L. McM., Tacoma, Wash.—I notice the printer (or my mistake) made me say in my article in the March issue that I used ½-in. nails for siding. Of course it should have been 1½ in. My directions for gluing mitered joints are not so clear as could be desired, either. The blocks should, of course, be glued on and the glue allowed to dry, then the joint glued and the clamps applied. The same method can be used in making picture frames.

To be your own architect is said to be worse than to attempt to be your own lawyer.

New Publications

Theaters and Motion Picture Houses. By Arthur S. Meloy. 122 pages, size 7 x 10½ in. Illustrated with line drawings by the author. Bound in board covers. Published by Architects' Supply & Publishing Co. Price $3.

Poor indeed is the hamlet or village at the present day that is unable to boast of at least one moving picture theater within its precinct, and with something more than 18,000 scattered throughout the country with an attendance that is figured at millions of persons daily, the observing architect and builder cannot fail to be interested in what must be regarded as the first book of designs of moving picture theaters which has yet been placed on the market. The work above referred to constitutes a practical treatise on the proper planning and construction of such buildings, and at the same time contains a vast amount of useful information including rules and data which cannot fail to prove of value to architects, builders and prospective owners. There are half-tone engravings of eight moving picture theaters scattered throughout the country and eighteen plates relating thereto, giving floor and balcony plans, sections, details, etc., all of which are of practical value. The descriptive text covers all those features concerning which the architect and builder desires information and among the tables is one giving in condensed form comparative laws of various cities. The matter is arranged with a careful regard to the requirements of the architect and builder, and considered as a whole, the work is one which should find a place in the library of every progressive architect and builder throughout the country.

Practical Perspective. By Frank Richards and Fred H. Colvin. 64 pages. Size 5 x 8 in. 64 illustrations. Published by the Norman W. Henley Publishing Company. Price, 50c.

The book, which is now in its fourth edition, is a practical treatise giving the principles of perspective written in such a way that they can be understood and applied by a mechanic. It is intended also for the manager who has to make sketches to illustrate his instructions and the draftsmen who must turn in the finished drawings. It tells how to make all kinds of mechanical drawings in isometric perspective. In doing this a brick is taken as a starter and the method is developed up to the sketching of irregular figures, such as five-pointed stars, etc. The use of isometric sketching paper by which it is possible to make a sketch in short order without using anything but a pencil is also explained.

Concrete and Reinforced Concrete. By W. L. Webb and W. H. Gibson. 240 pages. Size 4¾ x 7 in. 119 illustrations. Bound in flexible leather with gold titles. Published by American Technical Society. Price $1.50.

This is a condensed treatise on the problems of concrete construction which cannot fail to be of interest to the building contractor having to do with concrete work, whether plain or reinforced. The authors have endeavored to present the subject in a simple and concise manner, so that the younger element in the trade may readily absorb the principles involved. The composition and treatment of cement, sand, stone and mortar, the mixtures most commonly used, the reinforcing bars and the fireproof qualities of concrete are discussed in a way to afford accurate knowledge of their relation to the general subject in hand. The authors have taken special pains to render clear and simple the general theory of flexure in reinforced concrete, and the same is true of the design of the ordinary beam and girder type of floor. The text includes tables and diagrams by means of which designs may be made without recourse to other portions of the text. A comprehensive index, alphabetically arranged, is also a feature of the work, which is one that will be found a valuable addition to the trade library of the progressive builder.

Officers of Brick Makers Association

At the recent convention of the National Association of Brick Manufacturers the following officers for the ensuing year were elected:

President, C. J. Deckman of Cleveland.
First Vice-President, Fritz Salmen of New Orleans.
Second Vice-President, George H. Clippert of Detroit.
Third Vice-President, J. W. Robert of Clinton Ind.
Secretary, T. A. Randall of Indianapolis.
Treasurer, J. W. Siblay of Birmingham.

It is interesting to note in this connection that Secretary Randall was elected for the thirtieth successive term.

New Officers of Concrete Mixer Makers Association

At the meeting held during the period of the Cement Show in Chicago, Ill., the National Association of Mixer Manufacturers elected the following officials to serve for the ensuing year:

President .....A. Cameron
Vice-president..William A. Hart
Secretary.....H. E. Smith
Treasurer.....F. C. Wilcox

H. M. Capron was elected a member of the executive committee.

Meeting of Pennsylvania Building Material Dealers' Association

The annual convention of the Building Material Dealers' Association of eastern Pennsylvania was held at the Hotel Walton in Philadelphia on March 9, when officers for the ensuing year were chosen as follows:

President.....George F. Erich of Allentown
First Vice-President..E. L. Merriman of Scranton
Second Vice-President..Chas. A. Miller of Reading
Third Vice-President...J. L. Tyson of Philadelphia
Fourth Vice-President..O. W. Bennett of Sunbury
Secretary.....M. A. Kruder of Allentown
Treasurer.....Luther Keller of Scranton

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

A truss is a system of framework forming a skeleton beam. The top chord is in compression; the bottom chord is in tension; the web members (interior braces and ties) carry the shear. The parts must be in equilibrium, that is each push must be balanced by a pull, or a push from the opposite direction. This indicates the triangle as the perfect truss, for it cannot be changed in shape without breaking at the joints.

Trusses are of two kinds, those with parallel chords and those with non-parallel chords. The parallel chord truss will first be considered. Fig. 61 shows the development of the Pratt truss from two panels to six panels. Assume a load = 1 at the middle vertical. Half the load goes to each support so the coefficient for the two middle diagonal ties

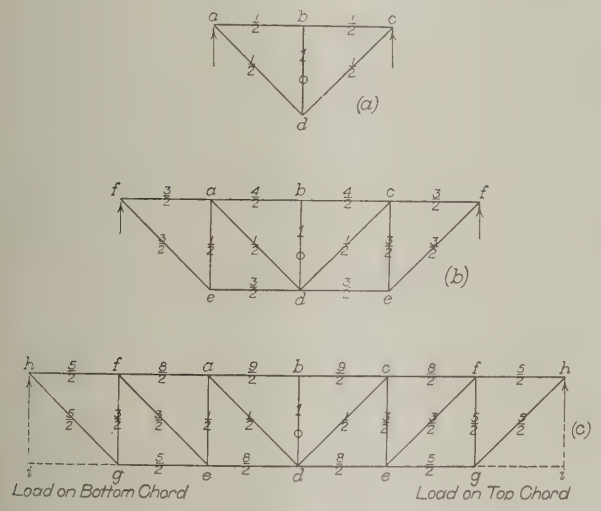


Fig. 61—Development of the Pratt Truss

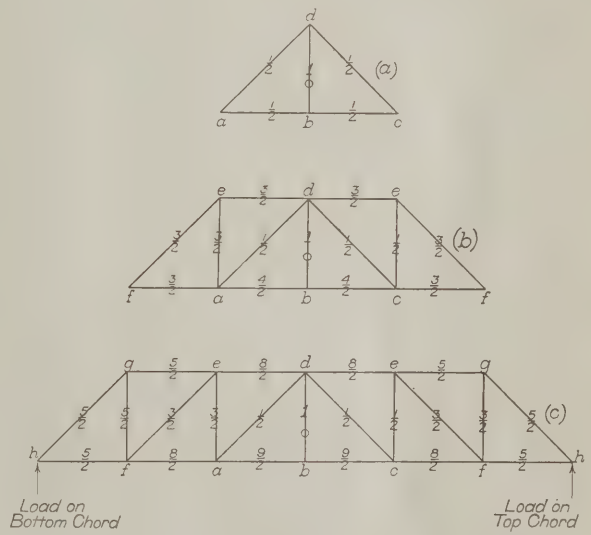


Fig. 62—Development of the Howe Truss

Design of Beams, Girders and Trusses

= ½. If the load is applied at the top, 1 is the coefficient for the middle vertical, but if the load is suspended at *d* the coefficient = 0.

In Fig. 61 (b) two panels have been added and it is assumed the panels are loaded equally, the loads being concentrated at the joints. The end panels not only carry the reactions from the original middle triangle but their own loads in addition. The diagonal ties *ef* are more heavily stressed on this account than are the ties *cd*, the stress being tension, for the whole load is suspended at the end points *f* This increased tension throws on the middle of the upper chord the added load of the end panels in addition to the load carried by the middle triangle, so the middle panels of both upper and lower chords are more heavily stressed than the end panels.

The coefficient for *ad* and *cd* = ½. When the unit load, 1, at the next joint is at *c* the coefficient for *ce* = ½ + 1 = 3/2, but if the load is at *e* the coefficient for *ae* = ½. The coefficient for *ef* is the sum of the coefficient for *dc* and the unit load on the line *ce*. The above explanations are based on the load being on one chord only. When there are loads on both chords there should be two sets of coefficients written down and their sum used. Using the positive sign (+) to indicate compression and the negative sign (—) to indicate tension the algebraic sum is meant when the stresses are opposite in kind. To check what has been stated: Note that there are three panel joints carrying equal loads, so 3/2 of the lotal load goes to each support. If the load is uniformly distributed one-half a panel load will be concentrated at *f*, but this is carried directly on the supports and has no effect on the stresses in the framework.

In Fig. 61 (*c*) two more panels have been added. If the load is on the top chord the coefficients are as follows:

$bd = 1$	$ce = 3/2$	$fg = 5/2$
$cd = ½$	$ef = 3/2$	$gh = 5/2$

If the load is on the bottom chord:

$bd = 0$	$ae = ½$	$fg = 3/2$
$ad = ½$	$ef = 3/2$	$gh = 5/2$

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 53 of the March issue.

Merely for illustration the end panels have been completed by dotted lines. The coefficient for hi = 6/2 (that is, it carries the reaction). The difference, $6/2 - 5/2 = \frac{1}{2}$, at h acts vertically and causes no stress in the truss. The member gi carries no load when the weights all act vertically, but in case of wind or rolling loads causing horizontal or diagonal action on the frame there will be compression on the member gi at the end where the load is applied and tension in the same member at the opposite end. When the vertical post hi is omitted the end, h, rests on the abutment and the truss is said to be suspended.

The Howe Truss

Fig. 62 shows the development of the Howe truss, which is merely the Pratt truss inverted. The verticals are in tension and the diagonals are in compression. The Pratt truss is usually the more economical and may be built of metal, or of metal and wood. The Howe truss is usually a combination of metal for tension members and wood for compression members. For maximum economy in metal trusses the compression members should be as short as possible, so the Howe truss is not well adapted for all metal construction.

Coefficients for the Howe truss are written as explained for the Pratt truss, with the stresses reversed in kind. The middle vertical, however, is opposite in character as affected by the load. That is, when the load is on the lower chord the coefficient = 1, but when it is on the upper chord the coefficient = 0. Practically, however, in the latter case the vertical does carry a portion of the weight of the lower chord in the middle panel. This is very small and the smallest sized rod used will more than take care of it.

What a Coefficient Represents

A coefficient represents the proportion of panel load carried by the member on which it is written. Coefficients are used only when all the panels carry equal loads, the truss then being symmetrically loaded. Instead of starting from the middle panel and working to the ends the coefficients may be obtained as follows: Count each panel load = 1. One-half the number of panel loads will be the reaction (expressed as fractional coefficients). From one end reaction subtract 1 successively at each panel joint and thus obtain the coefficient for each member in the following panel. The coefficient for the chord in any panel is the sum of the coefficients of the diagonals between that panel and the end support.

The weight (W) carried by each truss member is equal to the coefficient of the member multiplied by the unit panel load, P.

Let l = length of panel, center to center of verticals.
d = depth of truss, center to center of chords.
t = length of diagonal, center to center of chords.

then $$t = \sqrt{l^2 + d^2}$$

$$\text{Stress in diagonals} = \frac{Wt}{d}$$

$$\text{Stress in chords} = \frac{Wl}{d}$$

Stress in verticals = W.

The theory of coefficients is as follows: Assuming the truss to be symmetrically loaded with uniform loading on each panel, half the load on the middle panel alternately pulls and pushes (or pushes and pulls) on all the web members until the end of the truss is reached. Each panel load, as its point of application is reached, is added and the end web member carries half the entire load on the truss. Thus the load on the web members increases from the center to the ends and the load on a chord increases from the ends to the center. The end half panel load is carried by the abutments. It causes no stress in the truss.

(To be continued)

Drainage in Ancient Roman House

In connection with the work of excavation at the Roman City of Uriconium, Wroxeter near Shrewsbury, the remains of many houses superimposed one upon another were exposed, the earlier ones of wattle and daub being similar to the half-timbered houses common in Shropshire at the present day. They dated back to between 75 and 120 A. D.

From the report given by the director of the excavation, it is learned that one large dwelling-house had rooms heated with hot air, fine mosaic pavements in different colors, and hot, tepid, and cold bathrooms. One of the most striking points about this building was the drainage system. From a large water main running down the street side channels passed through the houses, having mouths raised 7 or 8 in. above the level of the main.

There were sluice gates at intervals, so that when the water was raised in the main it flushed out the drains in the houses and carried everything away to the River Severn. This was the first time these sluice gates had been discovered in a Roman town.

Another discovery was a large structure consisting of two walls inclosing a large space. No similar building had been met with in any Roman town. It was not easy to find out its original use, but probably it was a place for bull-baiting and other amusements. The excavations proved almost conclusively that the town was abandoned about the year 393; also, they had not found any evidence that the end of the town was a massacre and that the town was burnt as was generally supposed. Some of the objects found dated as early as 50 A. D.

A country house recently completed at Douglaston, L. I., is of somewhat unusual plan, the idea being to give maximum of light. The building occupies a corner plot and has wings set at right angles so that the light comes into the dining room, the living room, and the master's room in three ways. The exterior walls are of stucco, brick and half timber effects.

Plans are rapidly being prepared for the erection of twenty to twenty-five houses to accommodate the steadily increasing number of employees of the Corona Typewriter Company, Inc., at Groton, N. Y.



A Row of Cottages in Connection with Which Stucco Was Used with Pleasing Results in the Exterior Treatment

Stucco in Building Construction

Timely Suggestions for the Builder Regarding the Use of This Material—Kinds of Finish

By Edgar Parker



THERE has developed a stucco building period in this country, the architectural beauty of well-built stucco having popularized it among home-builders. The increasing demand for this construction may be laid to the general betterment of taste and to the extensive development of suburban home-building. The stucco homes already erected include some of the finest examples of the architect's and builder's art in this country, and this type of construction presents good opportunities for both the contractor and builder in developing new business.



A Very Attractive Example of Exterior Stucco Treatment

Poorly built stucco is on the decrease because of the greater care exercised by the builder, the excellent building accessories which have been developed and the thoroughness with which specifications have been worked out. Well-built stucco has both durability and beauty; it does not need constant repairs and painting; it forms a fire-retarding wall, maintains an even house temperature and grows harder with time. Used in conjunction with fireproof roofing and floors, a stucco home offers substantial fire protection.

Photographs by courtesy of Atlas Portland Cement Co.

Stucco is a mixture of Portland cement and sand, to which one part of lime is added for every ten parts of cement. The lime may either be hydrated or slaked lump lime. The advantage of using hydrated lime lies in the fact that the work of slaking or hydrating is done mechanically and there is then no chance of unslaked material getting into the plaster. If it is impossible to obtain hydrated lime ordinary lump lime can be used, but this must be thoroughly slaked before using.

The stucco mortar is made by mixing with the cement, lime and sand enough water to form a thick paste that can be applied with a trowel. Only as much as can be used immediately is prepared, as cement will start to set after thirty minutes. Cement mortar used after it has begun to set has been responsible for a considerable percentage of poor stucco work.

Stucco construction properly falls under two heads—stucco veneer and solid stucco. In stucco veneer the stucco is applied to a wall structure—brick, tile, concrete or frame. This can be done with both new and old structures. The renovation

with stucco of old buildings in good condition is a common practice, the stucco being used for both decorative and strengthening purposes.

In the case of new brick, tile or cement block surfaces the stucco veneer is customarily applied directly to the material, care being taken that the surfaces have ample roughness or absorption to assure a strong bond and key with the stucco. Standard specifications prescribe that the mortar joints should not be less than ⅜ in. thick and the mortar should be omitted from or raked out of the joints for at least ½ in. back from the face to which the stucco is applied. The stucco is then forced into the joints.

Stucco Veneer Frame

Stucco veneer frame is the more common construction. In the application of the stucco the important question of the proper lath arises. The opinion of builders who have used both wood and metal lath favors metal. The tendency of wood lath to warp and expand is an unsafe element, since the stucco is subjected to uneven strains. However, stucco on wood lath has given satisfaction in many instances. Between good lath and metal lath, stucco boards apparently hold an intermediary position.

With wood lath the sheathing is nailed to the studs, then covered with sheathing paper; wood furring strips are applied and the lath put on the furring strips. The lath is applied in either single or double layers. In single layer it is placed horizontally on the furring, and in double-layer work the layers are placed diagonally to the furring in opposite directions.

The wood lath should be thoroughly saturated with water before the plaster is applied, or the moisture will be absorbed from the cement. Another method of preparing wood lath is to paint it with two coats of any of the reputable bitumen waterproof paints to which plaster adheres. After twenty-four hours, and within six days of the application of the bitumen paint, the plastering should be started.

Stucco board is a commonly used lath, where the stucco is built up against a solid wall to which it keys thoroughly. While stucco board does not expand and contract completely to meet the contraction and expansion of the stucco, the difference in coefficients of expansion is small. Stucco board costs less than metal lath. Care, however, should be exercised to avoid the cheap variety, which is unsafe. Manufactured stucco board requires no furring and comes ready for application of first coat.

Metal Lath the Best Practice

Metal lath for stucco building represents by far the soundest practice. The better varieties on the market have been carefully designed to insure durable work. Two kinds are in use—expanded metal lath and close-meshed wire lath. The expanded metal type consists of metal sheets about 1/40 in. in thickness, which are slotted and expanded to form mesh of various shapes. Woven wire lath is a close-mesh wire cloth provided with wire stiffeners. Many of the metal laths are designed to be applied directly to the sheathing, and thus do away with furring. This greatly increases the speed of erection and at the same time reduces the cost.

In applying the stucco to metal lath it should be thoroughly pushed through against the inside waterproofing so as to completely bed the metal of the lath on both sides. If furring strips are used special care should be taken to fill all voids around the furring strips and where laths lap.

Solid Stucco Construction

The use of solid stucco construction has grown with the development of superior metal lath. Solid stucco is a solid slab of Portland cement mortar 2 in. in thickness, gaged with lime, built around the metal lath, which acts very much as reinforcing bars in reinforced concrete. The strength of such a wall is evident. All wood is eliminated except the studding. This is notched into the slab ½ in. to give bracing to the construction. The metal lath is back-plastered. The cost of solid stucco is but little more than veneer stucco, while at the same time it is more substantial and makes a fireproof wall. It is better adapted than stucco veneer for fireproof construction when used with hollow-tile floors and fireproof roofing.

It is frequently asked, how many coats of stucco should be put on? Possibly because stucco veneer was first applied to brick and stone there has been a tendency also to apply it in two coats on frame. This we believe is a serious mistake. Every effort should be made to get into stucco veneer on frame as much of the strength of solid stucco as possible; and the second or backing coat should not be used for finishing. Finishing should be left to a third coat. The first coat should be at least ⅜ in. thick over the face of the lath. The backing or second coat should be ⅜ in. The final coat should be ¼ in.

The Various Coats of Stucco

With solid stucco the first coat is at least ½ in. and is back-plastered to the same amount; the backing coat is ½ in.; the third or finishing coat should not exceed ⅜ in.

The thickness of the coats and the care with which they are applied give stucco its durability. The treatment of the finishing coat gives stucco its beauty and distinction. The beauty of its surface depends upon the skill of the manipulator. Fortunately, there are a number of standard finishes which can be satisfactorily produced without great experience. An original builder of stucco will often obtain interesting results by deviating from customary finishes. It is told that on one occasion such an original finish was obtained at the suggestion of the woman whose house was being stuccoed. She advised the men to press into the stucco the leaves on a branch; this was repeated around the entire wall with striking results.

White cements have been used as a final coating to give a wide variety of finishes and colors. This feature brings an additional element into play in the beautifying of home exteriors.

The following finishes are applicable to both the gray Portland cement stucco and to white finishes. They derive their names, as will be seen, from the methods used to create the proper surface.

Smooth Troweled—The finishing coat shall be troweled smooth with a metal trowel, with as little rubbing as possible.

Stippled—The finishing coat shall be troweled smooth with a metal trowel, with as little rubbing as possible, and then be lightly patted with a brush of broomstraw to give an even, stippled surface.

Sand Floated—The finishing coat, after being brought to a smooth, even surface, shall be rubbed with a circular motion of a wood float, with the addition of a little sand to slightly roughen the surface. This floating shall be done when the mortar has partially set.

Sand Sprayed—After the finishing coat has been brought to an even surface it shall be sprayed by means of a wide, long fiber brush—a whiskbroom does very well—dipped into a creamy mixture of equal parts of cement and sand, mixed fresh every thirty minutes, and kept well stirred into the bucket by means of the whiskbroom or a paddle. This coating shall be thrown forcibly against the surface to be finished. This treatment shall be applied while the finishing coat is still moist and before it has attained its final set—that is, within three to five hours. To obtain lighter shades add hydrated lime of 5 to 15 per cent of the volume of the cement.



Stucco Cottage for the Superintendent of a Country Estate

Splatter Dash or Rough Cast—After the finishing coat has been brought to a smooth, even surface, and before attaining final set, it shall be uniformly coated with a mixture of one part cement and two parts of sand thrown forcibly against it to produce a rough surface of uniform texture when viewed from a distance of 20 ft. Special care shall be taken to prevent the rapid drying out of this finish.

Pebble Dash—After the finishing coat has been brought to a smooth, even surface, and before attaining initial set, clean round pebbles or other material as selected, not smaller than ¼ in. nor larger than ¾ in., previously wetted, shall be thrown forcibly against the mortar so as to embed themselves in the fresh mortar. They shall be distributed uniformly over the surface of the final coat and may be pushed back into the mortar with a clean wood trowel, but no rubbing of the surface shall be done after the pebbles are embedded.

Exposed Aggregates—The finishing coat shall be composed of an approved, selected coarse sand, marble dust, granite dust or other special material, in the proportion given for finishing coats, and within twenty-four hours after being applied and troweled to an even surface shall be scrubbed with a stiff brush and water. In case the cement is too hard a solution of one part hydrochloric acid in four parts of water by volume can be used in place of water. After the aggregate particles have been uniformly exposed by scrubbing, particular care shall be taken to remove all traces of the acid by thorough spraying with a hose.



Stucco in Building Construction—A Modern Bungalow in Which Stucco Plays an Important Part

Tinted stucco is secured by the addition of coloring matter to white cements and gives a wide variation of color. In using coloring matter care should be used to select materials which will be permanent. Blacks are safe, as a rule. Ultramarine blue, if of good quality, will hold its color for a number of years, and when it begins to fade out does so evenly. It cannot be classed as a permanent color with black, brown or ochre. The following table of colors may help those contemplating the handling of stucco surfaces.

In selecting reds and browns it is safest to be guided by the table. A bright red shade will not be produced by the ordinary red oxide of iron at 3½ cents a pound. These colors are permament if high grade.

Yellow ochres offer a wide variety of shade and quality. French ochre, if genuine, is safe to use, and with it most attractive colonial yellow and buff tones can be secured. It is best to know the name of the manufacturer in buying coloring material, and also whether the color was specially designed for coloring cement.

Table of Colors to Be Used in Portland Cement

Color Desired	Commercial Names of Colors for Use in Cement	Approximate Prices per Lb. in 100-Lb. Lots for High-Grade Colors, Cents	Pounds of Color Required for Each Bag of Cement to Secure Medium Shade	Dark Shade
Grays, blue-black and black	Germantown lampblack	10	½	1
	Carbon black	8	½	1
	Black oxide of manganese	6	1	2
Blue shade	Ultramarine blue	18	5	10
Brownish-red to dull brick red	Red oxide of iron	3	5	10
Bright red to vermilion	Mineral turkey red	15	5	10
Red sandstone to purplish-red	Indian red	10	5	10
Brown to reddish-brown	Metallic brown (oxide)	4	5	10
Buff colonial tint and yellow	Yellow ochre	5	5	10
Green shade	Chromium oxide	26	5	10

The renovation of old buildings by means of stucco is worth the builder's attention. Unless renovated such buildings remain eyesores and their owners are not likely to go to the expense of complete rebuilding.

In renovating the exterior of an old brick building the stucco can be applied directly to the brick. The brick should be thoroughly cleaned with a weak solution of muriatic acid before the stucco is applied. The old mortar joints should be picked out ½ to ¾ in. from the face of the brickwork, and when the first coat is applied it is forced into these crevices and forms an excellent bond. Before applying the plaster the brick must be thoroughly saturated with water so that none will be absorbed from the plaster.

Builders sometimes prefer to use wire or expanded metal lath to keep the stucco to the brick. In such cases metal furring strips are attached to plugs driven in joints of brickwork, flush with surface, and the wire is fastened to these strips.

"Overcoating" of old frame houses, as renovating with stucco is called, requires more care than stucco veneering on brick or stone. The frame house should, of course, be gone over to determine if the framework will justify the improvement. Foundations should be examined to see if they will bear the additional weight of the stucco. Proper footings should be provided. Special attention should be paid to the studding. If it is decided that overcoating is practical the partitions and outside walls should be made plumb, poor weather boarding removed and furring and metal lath applied over the sheathing. It may be advisable to tear off the sheathing; the furring can then be fastened direct to the studding after bracing between the studs.

When furring is used of a depth which does not allow the space back of the lath to be entirely filled with plaster, provision should be made for extending the old window and door frames to correspond with the increased thickness of the wall. In some cases the plaster is brought over the old frames in such a way as to make an opening for a recessed window or door. When the furring is fastened to the studding it is not necessary to provide for extending the window and door frames, as the new stucco finish will be in the position of the old weather boarding.

To secure well-made stucco the builder should see that the following working details are followed. As indicated in the early part of this article, only a small quantity of plaster should be mixed at one time to avoid the use of cement which has begun to set. In all cases the various ingredients should be thoroughly mixed. Plastering should start at the top and the work carried downward continuously without allowing the plaster to dry at the bottom edge. If it is impossible to work the full width of the wall at one time the break should come at some natural division of the surface, such as window or door.



Stucco in Building Construction—Another Row of Stucco Treated Cottages in a Western Building Operation

Too rapid drying weakens the plaster. It should be covered with a wet canvas or the surface frequently sprayed when exposed to the sun or wind. Stucco should never be mixed or applied during freezing weather; the water will freeze before the cement has set, and the latter will not harden, nor should cement be disturbed after it has begun to set.

In the application of the various coats the first or scratch coat should be well roughened before the backing coat is applied. Each coat should be kept damp before applying the following coat to prevent absorption of water from the latter.

To obtain uniform results as to color and texture each batch of plaster must be mixed in the same proportions as the preceding one.

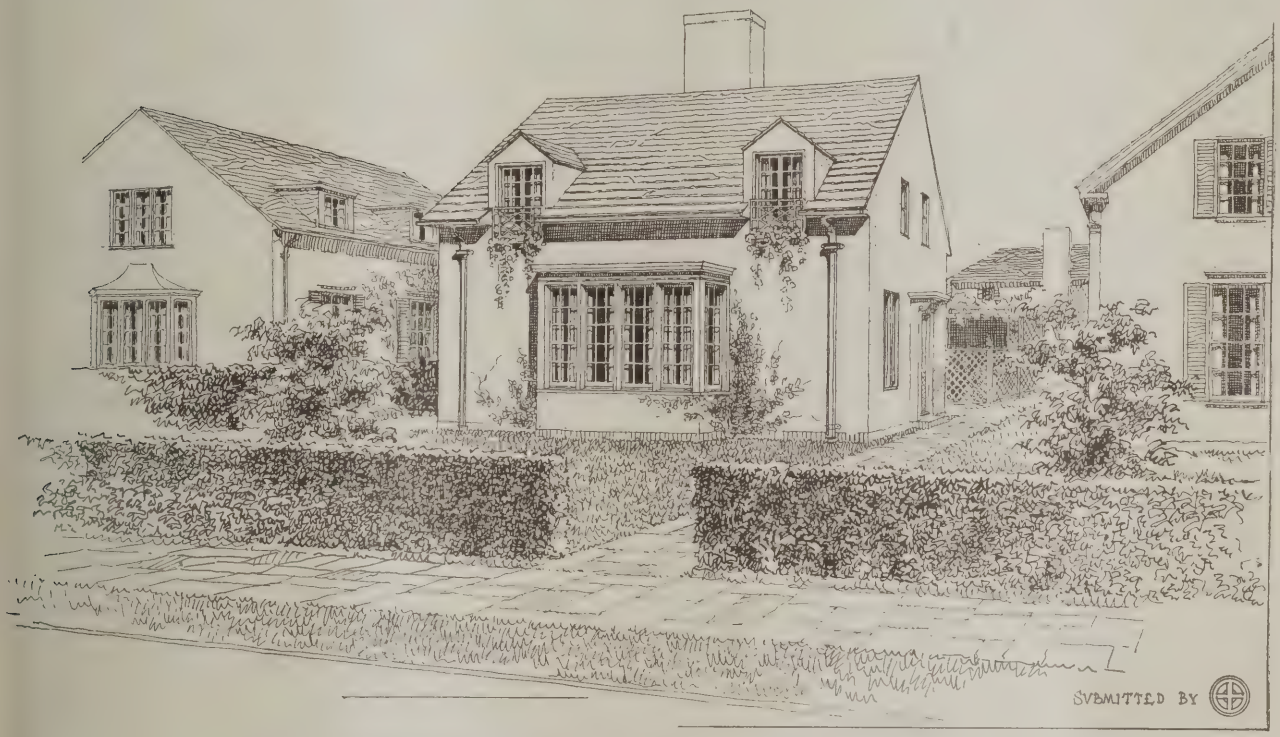
Prize Designs in $3000 House Contest

List of Winners and Perspectives with Plans of First, Second and Third Prize Designs

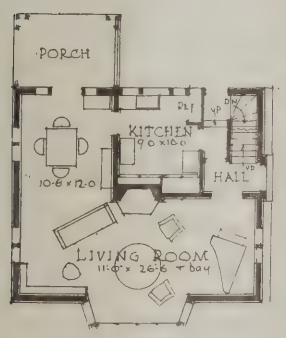
ONE of the very interesting features in connection with the recent Complete Building Show was a competition in houses costing not to exceed $3,000 each and conducted under the auspices of the Cleveland Art Association. It will be recalled that the exhibition in question was promoted largely in the interests of the Society for Fire Elimination—an organization of materialmen formed to further the use of various fire-resisting building materials.

In the contest in question something more than 300 sets of drawings were submitted, thus demonstrating the favoring use of fire safe materials the country over. With a view to conveying to the readers of THE BUILDING AGE some idea of the class of building treated in this contest we present the designs awarded first, second and third prizes, there having been seven prizes in all.

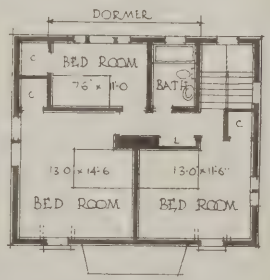
The design awarded first prize was that submitted by Olaf William Shelgren, a member of the Buffalo Architectural Club, and whose address is 1314 Prudential Building, Buffalo, N. Y. The design calls for the use of stucco with a roof of green slate. In the color scheme the window and door frames are green to blend with the roof. The committee in charge of the contest referred to this design as being "a model of compactness," the feature being the elimination of the entrance from



Perspective of the Design Awarded First Prize in the $3,000 House Contest



First Floor Plan



Second Floor Plan

Prize Designs in the $3,000 *House Contest—Design Awarded First Prize*

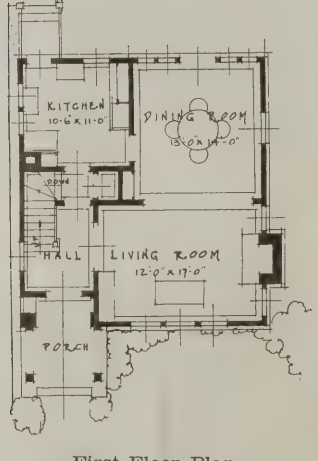
the front of the house and the substitution of a large bay window opening on three sides instead of the conventional porch. The dining room is a part of the living room with French doors opening out on the porch. The kitchen contains all the necessities of the culinary department and the stair arrangement provides an excellent short-cut from the working section of the house to the second story.

The authors of the design awarded the second prize were S. C. Merrell and C. H. Dittmer, connected with the staff of Charles S. Schneider, a well known architect of Cleveland, Ohio. Here stucco was chosen for the exterior and the design is one well suited to the requirements of a small family. terrace across the front with its suspended covering, its large bay window and steep roof give a suggestion of a quaint old type modernized for present use. The large hall with the combined stairway under which access is given to the kitchen are features of the first floor layout, while the two large bedrooms are features of the second floor plan. The position of the stairway is such as to receive ample light from the window at the landing half way up, while the bathroom being directly over the kitchen permits of an economical disposition of plumbing fixtures.

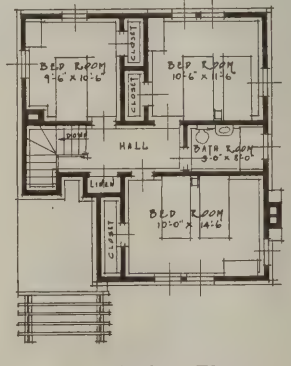
The author of the design awarded fourth prize was Frederick A. Harburg, 94 West One Hundred



Perspective of the Design Awarded the Second Prize in the $3,000 House Contest



First Floor Plan



Second Floor Plan

Prize Designs in the $3,000 *House Contest—The Second Prize Design*

The recessed porch and the excellent arrangement of stairs are features of the first floor plan, while the large family bedroom with commodious closets and the central hall from which all rooms upon that floor are readily accessible without waste space are features of the second story.

The third prize was awarded the design submitted by H. W. Peebles and Richard J. Hazelwood of 82 North Elizabeth Street, Detroit, Mich. This design is such as to lend itself readily to the use of stucco with dark roof and white trim. The paved and Sixty-second Street, New York City, who chose a colonial type for his subject.

Stucco metal lath were chosen as construction materials of the exterior treatment in connection with the design awarded fifth prize which went to C. C. Tallman, 17 Dill Street, Auburn, N. Y.

The sixth prize went to Henry P. Whitworth, 155 Carylon Road, Cleveland, Ill. The house was of the cottage type and hollow tile was specified as the material for use in its wall construction. The combined stair and entrance hall with direct passage

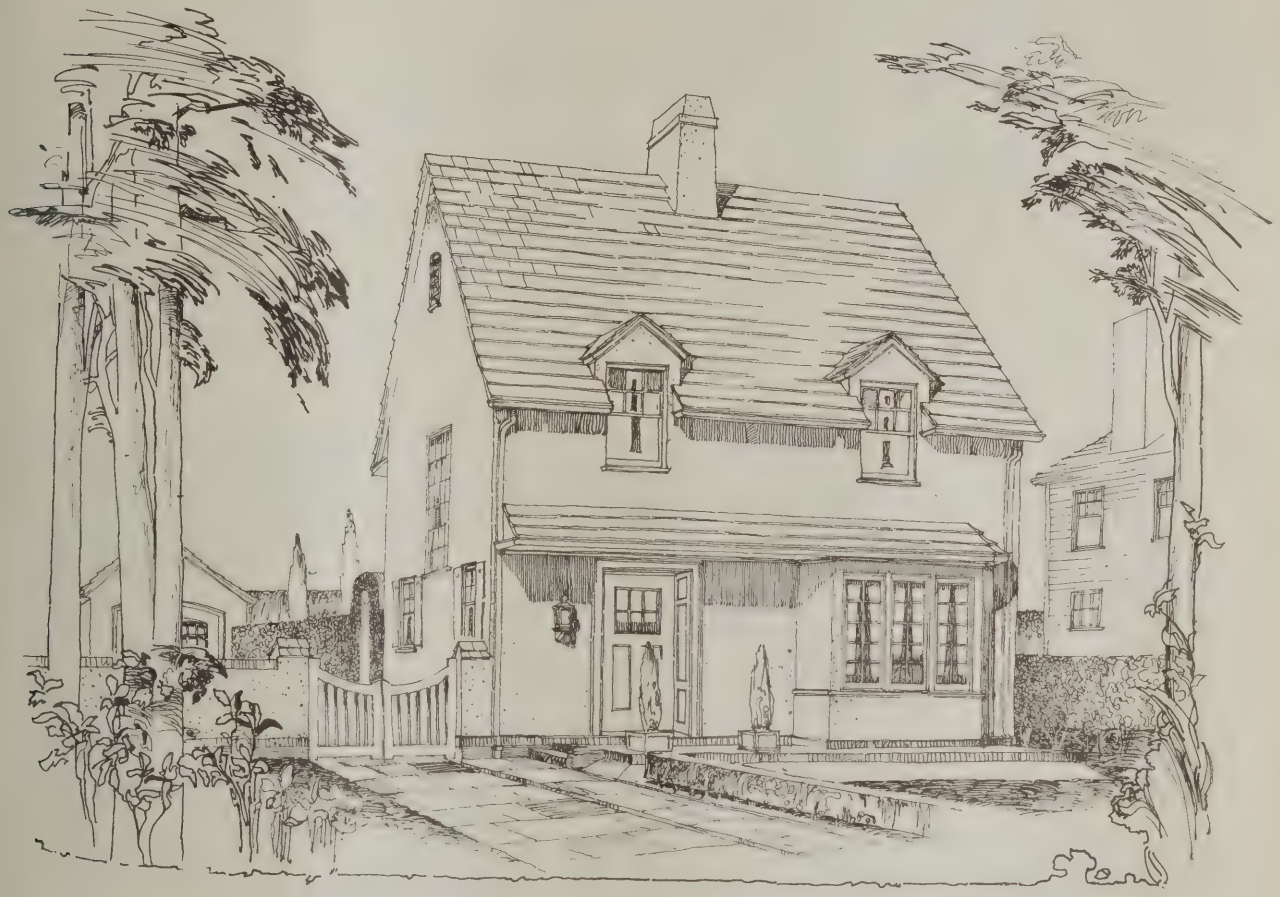
to the kitchen showed excellent use of the limited space available. The position of the refrigerator at grade entrance avoided the necessity of entering the kitchen in order to supply it with ice.

The design awarded seventh prize was submitted by Maurice Feather, 129 Langdon Avenue, Watertown, N. Y., who evolved a house of interesting exterior. Stucco was chosen for the finish, and the roof lines were broken up in a way to render the design unusually effective. The placing of the enclosed porch and entrance upon opposite sides of a front wing with a single large chimney placed in the center of the building were features of the design.

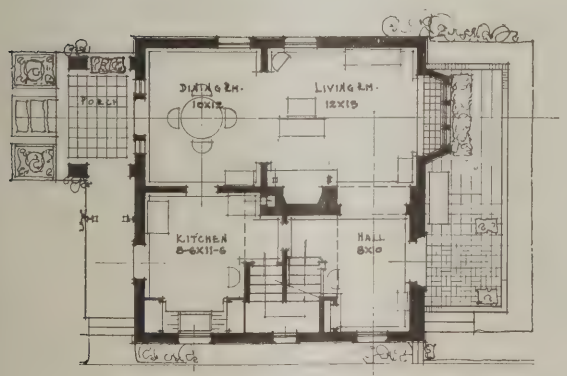
The judges appointed by Abram Garfield, President of the Cleveland Chapter of the American Institute of Architects, were Charles S. Schneider, Albert S. Skeel, W. R. Watterson, R. G. Hubby and H. Dercum.

Plans have just been filed by architects Timmis & Chapman for a six-story factory building to cost $250,000, and which will take the place of three old shacks located at the corner of Frankfort and Rose Streets, New York City, in what is known as the "Swamp" district. The new building will cover an area of 46.6 x 116.3 ft.

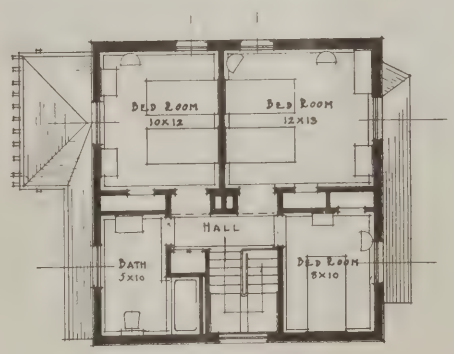
We understand that arrangements have been completed for the erection of more than 100 homes in Struthers, Ohio, work to be commenced shortly after April 1 and rushed to completion. The houses will be of moderate cost, construction ranging for the most part between $2200 and $5000.



Perspective of the Design Awarded the Third Prize in the $3,000 House Contest



First Floor Plan



Second Floor Plan

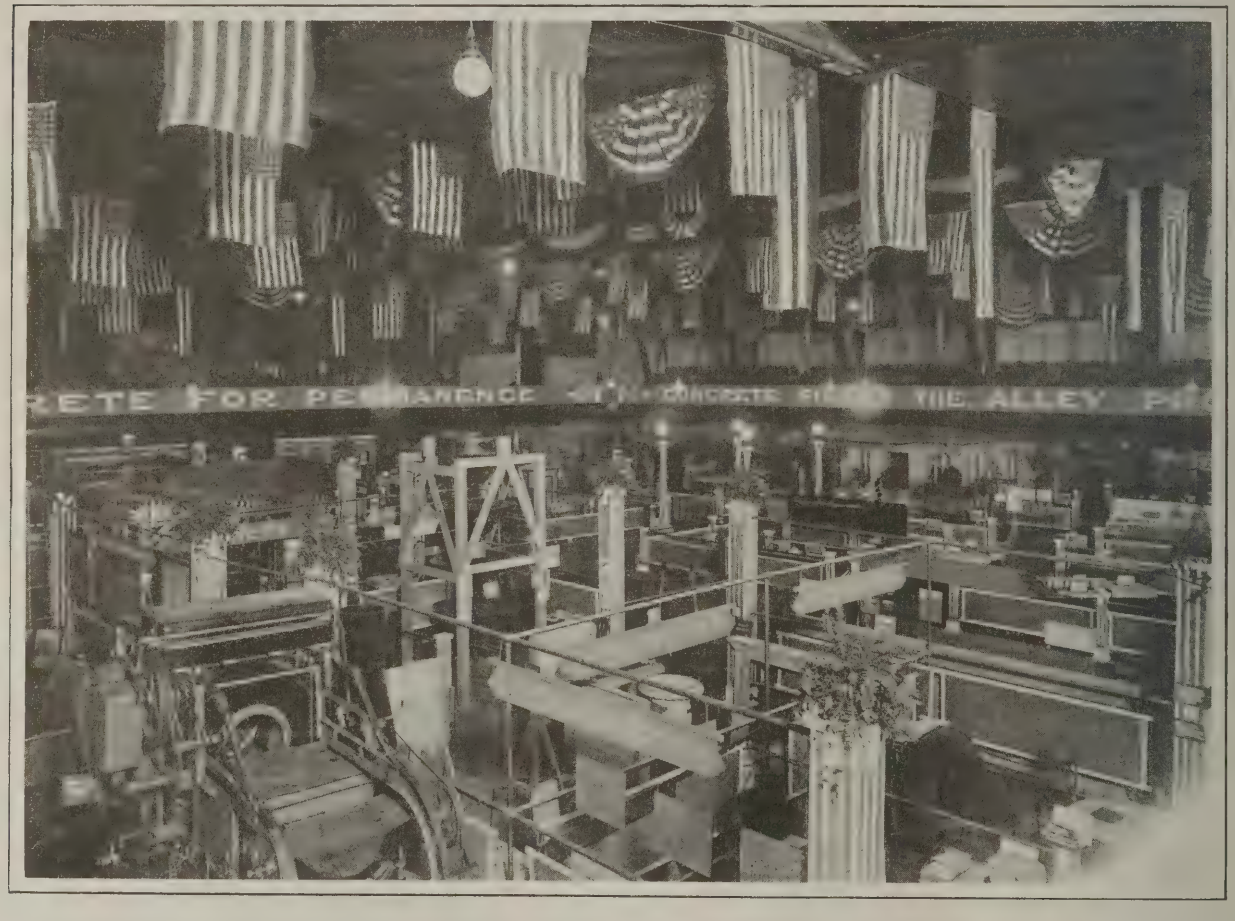
Prize Designs in $3,000 House Contest—The Third Prize Design

New Goods Seen at the Cement Show

An Array of Up-to-Date Builders' Equipment Which Was an Education in Itself

ONE year ago THE BUILDING AGE established a precedent by presenting in one article the features of the various new equipment displayed by manufacturers exhibiting at the Cement Show in Chicago, Ill. Among other reasons, it was prepared for the benefit of those who found it impossible to attend the exposition yet were intensely interested in the latest improvements brought out during the previous year. This enterprise met such hearty approval on the part of the building and contracting trades that it was decided to repeat the performance this year in the April issue, without doubt one of the most important numbers of the year, in that it precedes the opening of the building season. A close study of the contents of this article will enable those contemplating the purchase of new equipment to discriminate in their buying. On account of space limitations it is impossible to describe minutely the many features claimed by the different manufacturers, and the suggestion is therefore made that interested readers communicate direct with the makers who will be found ready to help in the selection of suitable equipment for specified needs.

Several manufacturers of motor trucks were present this year to meet contractors and point out the possibilities of reducing hauling costs by using trucks in preference to horses and wagons. Though the trucks exhibited were of large capacity, principally of the 3-ton type, the salesmen distributed catalogs which contained much valuable information on light trucks having 1 and 1½-ton capacities. It was pointed out that the motor truck is capable of delivering men and materials direct to the job in fast time, and numerous trips can be made during the day. Statistics were presented to illustrate the low cost of operation, and books of photographs were convincing evidence that progressive contractors in all parts of the country are finding the purchase of motor trucks a profitable investment. The following companies were represented at the show: International Motor Co., New York; Sterling Motor Truck Co., West Allis, Milwaukee, Wis.; The Garford Motor Truck Co., Lima, Ohio; The Service



General View of the Armory in Which Many Interesting Exhibits Were Displayed During the Period of the Recent Cement Show in Chicago

Motor Truck Co., Wabash, Ind.; The Gramm-Bernstein Co., Lima, Ohio, and the Federal Motor Truck Co., Detroit, Mich.

The New Goods

One year ago we had the pleasure of describing the features of the new No. 5 batch mixer of the Eureka Machine Co., Lansing, Mich. When the company's booth in the Armory was visited in February it was learned that two larger models had been marketed during the year, the Nos. 7½ and 10. These numbers denote their respective capacities in cubic feet of unmixed material per batch. Attention is called to the substantial drum which houses properly arranged steel blades which assist in forcing the aggregate into perfect uniformity. Each machine has a drum which consists of a double cone of unequal tapers comprising only three parts, the large semi-steel conical head with gear and a slightly smaller rounded head being joined together by a shell of heavy boiler-plate steel. The mixing chamber is of the non-tilting type and is gear driven. The side loader is the pivoted type, and is provided with a clutch which is automatically released when the bucket reaches the discharge position. The batch hopper has the same capacity and opening as the drum. The water tanks are of the positive measuring type with capacities from 12 to 15 gal., operating at 125 lb. working pressure. Every machine is tested under its own power before shipment, and a complete set of tools goes with each outfit. Close fitting guards are provided over all exposed working parts. All bearings are supplied with compression grease cups, and the equipment receives two coats of paint and varnish before shipment.

The Amalgamated Roofing Company of Chicago, Ill., was another new exhibitor. The display consisted, as shown in Fig. 1 of the illustrations, of a small house



New Goods at the Cement Show—Fig. 1—The Exhibit of the Amalgamated Roofing Co.

which had its roof and sides covered with asphalt shingles of various colors. This interesting method of showing the company's products enabled the representatives to explain just how the shingles are applied and to further demonstrate how harmonious effects may be brought about. The advantages of asphalt shingles were enumerated when it was said that they are waterproof, fire-resisting, economical, in that the overhead expense is reduced to the minimum, attractive and easily applied. The company's "Nu-Tile" shingles are made in three colors—red, moss green and white—and measure 12¾ in. long by 8 in. wide. They are packed in boxes containing ¼ square each. Another product is manufactured in rolls 32 in. wide by 41½ ft. long to imitate brick siding, black lines being inlaid to indicate the brick design. Strip shingles are also made 10 and 12¾ in. wide, and some very artistic effects may be produced by the use of the company's "In-Lade" roofing of "Diamond Square," "Spanish Ripple" and "Offset Shingle" designs.

The ever-increasing and varying uses to which concrete is adapted has proved that it is the ideal building material for every purpose in that it does not deteriorate with age and exposure. A great many con-



Fig. 2—Cottage with Roof Covered with "Concretile"

tractors who visited the Armory were interested in the exhibit of the Walter Concrete Machinery Co., Saks Building, Indianapolis, Ind., which demonstrated "Concretile." It was said that this tile has been used in Europe for many years with considerable success. Its manufacture is an operation that is simple for any man used to handling concrete, and the equipment is inexpensive. "Concretile" is fireproof, storm-proof, waterproof, indestructible and easily applied. The company sells the machines for making this tile, and it is said that the average cost of manufacturing 100 sq. ft. of "Concretile," including all labor and materials, is $2.50. In Fig. 2 of the illustrations is shown an attractive bungalow in Indianapolis roofed with this product. While the capacity of these machines is limited only by the skill of the operator, the average production varies between 35 and 50 tile per hour. The average cost of laying "Concretile" on the roof for every 100 sq. ft. does not exceed $1.50, and complete specifications for covering all types of roofs are furnished to buyers of machines. The tile can be manufactured in variegated shades, all beautiful and rich in tone.

Visitors to Booth No. 178 in the Coliseum were greeted by Joseph Stretch of the International Concrete Construction Co., of 47 West 42nd Street, New York

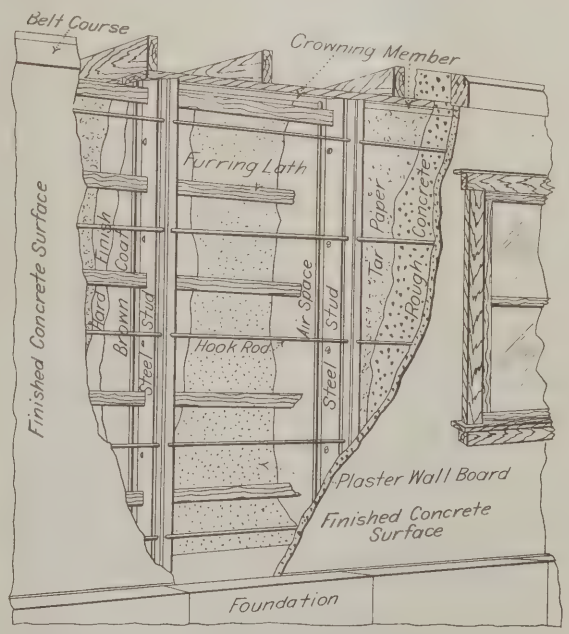


Fig. 3—Broken View of Wall of a Building Showing New Method of Reinforced Concrete Construction

City, who explained a newly patented method of erecting reinforced concrete structures without the usual molds. Mr. Stretch stated that pressed steel channels

are used for studding instead of reinforcing rods, two channels back to back forming an I-stud. The foundation of any residence, bungalow, or other structure is erected in the usual manner of any suitable materials, and a steel footing strip to line, level and secure the wall in place, is anchored to the top of the foundation. The channels are cut stud length and laid out upon the ground back to back in pairs and spaced apart on two leveling planks. Furring lath cut to length is set in the channels, and gage strips are placed between the backs of the channels. Sand or loam is leveled in to the top of the furring strips, and tar paper is then laid between the studs. Lateral iron rods tie the channels and rough concrete is then filled in and faced off with a rich finishing mixture of any desired color or appearance. All door and window openings have rough frames set into the channels, ready to receive the window and door frames and trim. When the concrete has hardened, these cast reinforced wall sections are set in place and the channels secured together, forming an I-studded reinforced concrete wall, furred off for air space, ready for the inside finish. An angle steel crowning member is secured to the top of the wall ready for placing the floor joist, or in case of a one-story bungalow, to receive the plate for securing the rafters. No metal lath or stucco is plastered on. A contractor's equipment may consist of a few inexpensive gage strips and clamps for pouring belt courses. An idea of the construction is afforded by Fig. 3. Mr. Stretch demonstrated the low cost of this method of construction by showing the cost of building a small bungalow, 20 x 23 ft., at Beechwood, N. Y. The investment was $478.14 as against a contract price of $705. Of this sum about $150 was spent for workmen's time and the cost of superintendence. Building materials cost $225.38, and the rest of the cost was divided between the mason, well driver, painting, sand, gravel, cartage, reinforcing metal, lumber and freight.

Much has been said in recent years about the efficiency of the motor truck, and many contractors would undoubtedly feel justified in purchasing such



New Goods at the Cement Show—Fig. 4—Trailer, Known as a "Contractors' Special" for Motor Trucks

modern equipment if it were not for the fact that it involves such a large investment. The problem has been solved to some extent by the manufacture of trailers, and at the Cement Show the Miles Manufacturing Co. of Jackson, Mich., exhibited model 33, known as the Contractor's Special and shown in Fig. 4. This trailer has capacity to hold 1200 lb. It is of the rack style, 86 in. long and 42 in. wide, with an inside depth of 16 in. The sides and ends are removable. The wheels have 1 3/8 in. spokes and are 34 in. high, with solid rubber tires. The axle and springs are of substantial construction and the draw-bar is a heavy pole, reinforced with steel and adjustable to any height auto frame. The trailer can be instantly attached or detached from the car by removing one pin, no tools being necessary. The bracket fastens to the frame of the car, above the springs, taking advantage of the full spring action from the car and removing all vibration from the draw-bar and trailer body. The trailer is painted green.

The latest improvement in "Big-an-Litle" concrete mixers, manufactured by the Yaeger Machine Co., 216 West Rich Street, Columbus, Ohio, is a new spouting outfit, and nine reasons are advanced to prove its usefulness. This equipment was designed and perfected for the purpose of eliminating all labor possible in the placing of mixed concrete in forms on such work as foundations, piers, abutments, etc. The uses to which it may be applied are many and varied, and the savings effected are said to be considerable. By setting the mixer at the most convenient place to have the material, time is saved in loading. Speed is increased, as while one batch is being mixed the car is being dumped. The capacity of the mixer is increased as the entire batch is dumped at once in a skip car



Fig. 5—View of the New Yeager Spouting Outfit

instead of into several wheelbarrows. Economy is effected, as no concrete is spilled—all that goes into the mixer goes into the forms. Wheeling of cement is eliminated, and only one man is required at the delivery end of the spout. The outfit may be erected in 90 min. and dismantled in 45 min. The construction of the incline car track and spouts is standardized and therefore interchangeable, and can be adapted to any job. Power to operate the skip car is taken from the auxiliary hoist on the mixer. The entire plant of hoisting and mixing is combined in the one machine and may be operated by one man. Specifications call for a mixer with loader and auxiliary hoist; 5 hp. engine; incline track of 4 in. channels in 10 ft. sections, 5 sections to a plant; adjustable legs of angle iron; skip car of 6 cu. ft. capacity, capable of automatically dumping an entire batch into the receiving hopper. The spouts are 12 ft. long and operate on pivots, swinging to any point desired. The outfit in use is shown in Fig. 5 of the illustrations.

In response to a continued demand by contractors in many parts of the country for a smaller mixer than they have been making in past years the Marsh-Capron Manufacturing Co., Lumber Exchange Building, Chicago, Ill., exhibited for the first time its new "Universal" concrete mixer as shown in Fig. 6. It has a guaranteed capacity of 7 cu. ft. of mixed concrete, of any standard formula, and is rated by the National Association of Mixer Manufacturers' Wet Batch Rating. Its loose capacity, of mixed cement, sand and stone is 11 cu. ft. The "Universal" is designed to give the greatest possible convenience in dumping wheelbarrows directly into the hopper without spilling the aggregates. The platform is 19 in. from the ground and the distance

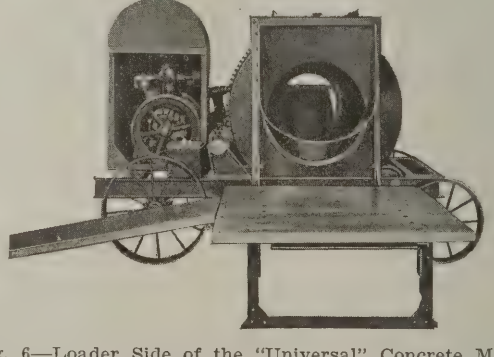
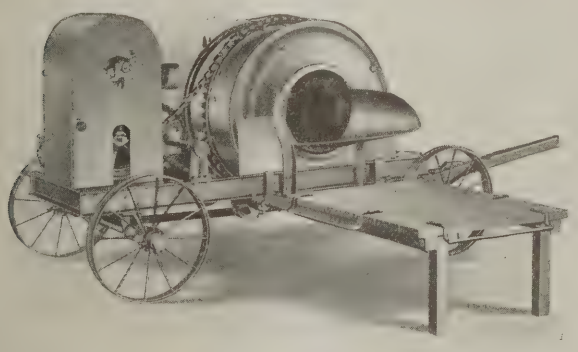


Fig. 6—Loader Side of the "Universal" Concrete Mixer

from the mouth of the charging hopper to the platform is 10 in. The hopper is 30 in. diameter, with an opening into the drum of 26 in. diameter. The equipment has a steel frame and the drum has a shape that readily cleans itself. It has five buckets and blades of steel, securely bolted to the inside of the drum. The drum

revolves on rolled channel-iron tracks. The mixed concrete is discharged from the side of the mixer. The discharge hopper is of the apron type, and the entire batch can be emptied in a few seconds. The diameter of the discharge opening is 17 in., insuring a rapid, easy flow from the drum. The gears are made of semi-steel and the drum gear, which is similar to the well-known segmental gear, center drive of Marsh-Capron rail-track mixers, is arranged in four interchangeable parts, any of which may be replaced in case of accident. The mixer is operated by a 4 hp. gasoline engine. A wide, roomy low platform is provided, having dimensions of 5 ft. long and 4 ft. wide, and may be folded up when not in use. A friction clutch is provided between the engine and the mixer, making it easy to start the engine at any time. The approximate measurements are: Height overall, 56 in.; entire length, 7 ft. 9 in.; width overall, 5 ft. 6 in. The mixer weighs, without platform, 2500 lbs. The company states that it is built for service, for most mixing with least fixing at least cost, for convenience in charging, mixing and moving. The steel used in its construction is said to have enough weight to insure long wear without breakdowns.

The Oshkosh Manufacturing Co., Oshkosh, Wis., was one of the many companies exhibiting new concrete mixers, one of which is shown in Fig. 7. Its latest models are made in two sizes, the No. 7 with capacity to mix 5 cu. ft., and the No. 11 for 7½ cu. ft., specifications being according to the wet batch rating of the National Association of Mixer Manufacturers. The drum heads are made of heavy semi-steel and the center of heavy sheet steel, assembled with large bolts that lock all parts together as though they were one piece. All surfaces are rounded to eliminate corners in which concrete would be likely to clog. The buckets are large, being built of heavy semi-steel, and the blades are substantially constructed. These are raised from the drum to allow the water to run beneath, thus wetting the entire batch quickly and keeping the drum washed clean. On the outside, the tracks on which the trunnion wheels travel, are cast extra heavy and accurately machined to reduce friction and to insure smoothest running. The drum is revolved by means of a steel bushed roller chain. When the dry material is dumped into the drum it is thrown in among the paddles. As the drum revolves, the paddles plow it over into the buckets, which carry it up and drop it on to the inner end of the discharge chute. This throws the mix back into the paddles again and the operation is repeated. Thus the batch is split up and turned over four different ways all at once. The hopper is made of heavy steel plate, 40 in. wide, and is loaded direct from the wheelbarrow. It is situated 14½ in. above the platform with a steep pitch, so that the material runs into the drum without shoveling or pushing. The discharge side of the drum is fitted with a semi-steel guard plate to prevent slopping and to keep



New Goods at the Cement Show—Fig. 7—Loader Side of the New Oshkosh Concrete Mixer

the mixer clean. The discharge chute is turned up high on the sides and is mounted on the slop guard on a pivot, an easily operated lever at the right of the drum controlling its position. When turned up it assists in one of the mixing motions, and when turned out is at a convenient height to load a wheelbarrow without splashing. The loading platform is 4 x 3 ft., 20 in. high, built of 1½ in. maple planks. Steel ledges are provided for runways. It seems that the company has left nothing to be desired in the construction of the frame, trunnion rollers, trucks, clutch and chains. The power is supplied by the well known Novo engine, and the larger size may be equipped with steam power if desired. For a small additional charge a power-driven hoist may be had for use in elevating concrete in the construction of silos and other structures.

In the foreground of the picture on the first page of this article will be seen the display of the T. L. Smith Company, Milwaukee, Wis., and among the features of

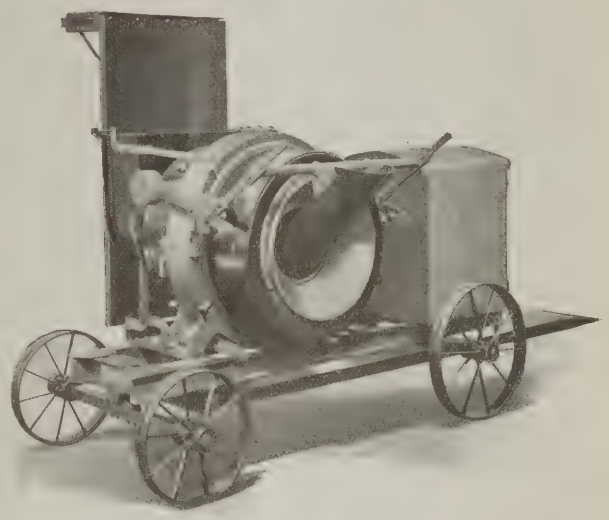


Fig. 8—View of New Smith Low Charging Concrete Mixer

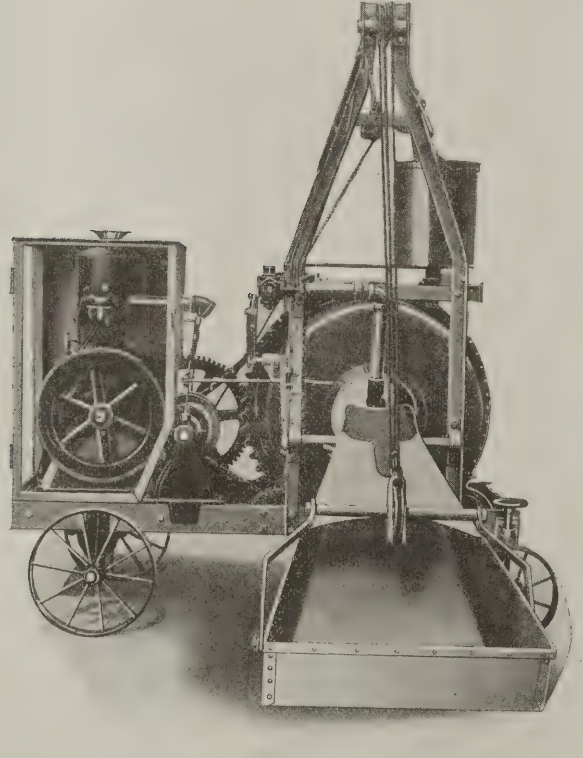
interest were two new types of Smith equipment. One of these was a new line of low-charging mixers comprising four sizes. From an inspection of Fig. 8, which represents one of the sizes, it will be seen that the mixer is mounted on a steel truck, is readily portable and indicates the manner in which the hinged platform may be hooked up out of the way. The runway lifts off and is carried on special brackets under the truck, all as clearly shown in the picture. The rigidly cross braced steel channel truck is fitted with strong wheels and heavy steel axles, thus rendering the machine capable of withstanding hard usage to which it is likely to be subjected. One feature which commanded a great deal of attention on the part of visiting builders and contractors engaged in concrete work was the loading platform which is only 16 in. high on all sizes.

The other new machine displayed was a new type of high drum paver, one of the chief features of which is an absolute water-weighing device. When the gage is once set each succeeding batch will contain an equal amount of water by weight rather than by volume. Another important feature of this machine is the long spout swiveled chute which is pitched at an angle of 20 deg. so that the concrete will easily slide downward.

A display which was the center of interest on the part of a large number of visitors during the period of the Cement Show consisted of six low-charging concrete mixers having a capacity ranging from 3 ft. up to 16 ft. mounted on truck with gasoline engine and made by the Standard Scale and Supply Company, Pittsburgh, Pa., and with branch offices in leading cities of the country. Both the "Standard" and "SSS" types of mixers were shown, the former being equipped with folding platform which, with the low-charging open drum, the thorough mixing device, the semi-automatic discharge and simplicity of construction throughout, are special features of this low-charging design. Of the "SSS" mixers two new sizes were shown, one being the new low-priced machine having a capacity of 9 cu. ft. of unmixed materials mounted on truck and equipped with gasoline engine. This new machine has a capacity of one bag batch up to 1:3:5 mix. The other new size, also mounted on truck with housed 4-hp. gasoline engine, will take care of any one

bag batch up to 11 cu. ft. of unmixed materials. All of the machines exhibited were equipped with belt drive and floating idler, this drive having been brought out in the last year or two and being especially desirable, as the belt drive is not only simpler than friction clutch drive but absorbs all the jar from the mixer and is not carried back to interfere with the engine. An excellent picture of the company's display was presented on page 56 of the March issue of the paper.

The line of equipment made by The Knickerbocker Co., Jackson, Mich., was notably augmented during the past year by the marketing of three new concrete mixers—the Nos. 5, 7 and 8. The numbers of these machines denote their respective capacities in cubic feet of unmixed material. The company emphasizes the fact that it has been building concrete mixers since 1904, and in offering the new 1916 equipment it represents twelve years of experimenting and improving in order to present the discriminating contractor with ideal mixers. The Knickerbocker construction shown in Fig. 9 embodies an extra heavy all-steel frame and on all models a cold rolled steel shaft is used for the rear axle. In order to prevent tipping or straining the frame when a power loader or stationary batch hopper is being used, there has been provided what is known as a "fourth point suspension," constructed in the following manner: To the sill on the charging side and directly over the front axle is bolted a casting, bored and threaded, through which runs a cold rolled screw shaft. By means of a hand wheel, this shaft may be lowered to rest on the front axle. On Model 5 there is a 3 h.p. Bates & Edmonds Bull Pup gasoline engine, and on the larger sizes a choice of Ideal or Novo gas engines is offered. The mixers have a drum which has been designed and built for long, hard service. The body is of heavy steel plate, securely riveted to drum heads of solid cast semi-steel. The drum heads and tracker bands are cast in one piece, not bolted or riveted together, thus insuring rigidity and solidness that needs no adjusting or care. Five buckets and five blades, one reversed, are arranged



New Goods at the Cement Show—Fig. 9—Loader Side of New Knickerbocker Concrete Mixer

in the mixing chamber to give a quick and thorough mixing action. Four of the blades are raised from the drum to facilitate cleaning. The automatic water tank is an extremely simple affair. The volume of water is controlled by an adjustable float valve and the flow is regulated by a three-way cock. The company calls special attention to the various parts on which the wear usually comes and commends the many features of construction to those contractors who are desirous of purchasing mixers that will stand the hardest kind of use.

A new company to be seen in the Coliseum Annex was the Brownwall Engine & Pulley Co. of Holland, Mich., and R. G. Pulver, who officiates as sales manager, dispensed information on the features of "Brown-

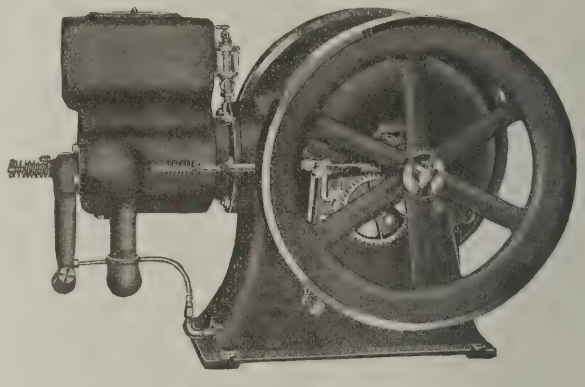


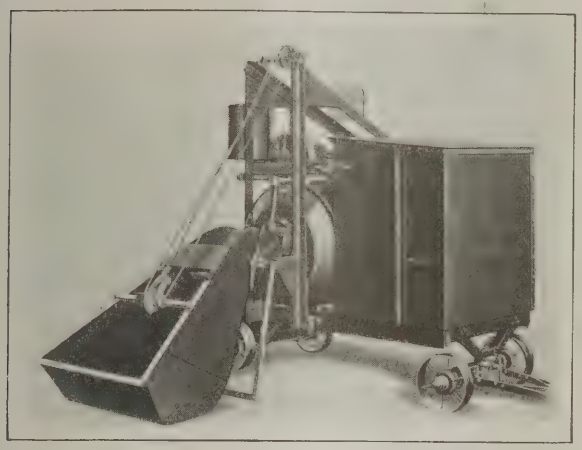
Fig. 10—The New "Brownwall" Engine

wall" hopper and air-cooled engines. It was said that this engine, shown in Fig. 10, is especially adapted for operating concrete mixers, twelve of the largest mixer manufacturers in this country having used it successfully. Large numbers are also sold to manufacturers of other contracting equipment and individuals who use automatic tampers, cement block outfits, etc. It does its work well on account of the simplicity in construction, light weight and compactness. Its special features are the inclosed crankcase, absence of cylinder head packing, a solid cast-iron base in which gasoline is stored, thus eliminating the galvanized-iron tank and leakage troubles, specially constructed valves that can be taken out and replaced in 10 min., and the first-class workmanship and material throughout. In the hopper cooled type the horsepower ranges from 1¾ to 10 and from 1¾ to 6 hp. in the air cooled models. With each equipment is given a five-year guarantee against defect in material and workmanship.

The Cellular Lath Co., 5126 North Second Street, St. Louis, Mo., made a most successful debut at the Cement Show by exhibiting "Keezon" lath, a product which is claimed to save approximately 30 per cent in the cost of labor and materials. This lath consists of a cellular structure formed of fibre board and wood, heavily coated with a creosote and damp-resisting preparation to prevent any excess moisture from affecting the lath structure in case of a rain before the roof is on the building or when plaster is applied. Numerous rigid tests of the fireproof qualities of this lath have been made with the most satisfying results, it is said. "Keezon" lath is manufactured in standard units of convenient size to handle, each unit measuring 48 x 6¾ x ⅜ in. Four units cover a yard of wall and require but 48 nails to hold them securely in place. Narrow strips of wood set on edge effectively prevent warping, and give the tensile and compressive strength of the unit. The extreme rigidity thus secured makes the tieing of joints wholly unnecessary, which is an economical feature. Owing to the fact that this lath contains six separate cells to the square inch, each three-eighths of an inch deep, only enough plaster to cover the surface of the lath is required to secure a perfectly keyed wall or ceiling. This requirement is said to be much cheaper when compared with wood or metal lath, resulting in reducing the amount of material used and time necessary to apply it. The company states that the seven-eighths inch ground usually left around window and door openings where wood lath is used can be reduced to five-eighths of an inch when "Keezon" lath is used, thus saving one-quarter of an inch of plaster over the entire surface. This lath may be applied directly to any flat surface, and will key perfectly without furring. It is also stated that the second coat of plaster may be applied without waiting for the first or scratch coat to dry and without moving the scaffold. On account of its extreme flexibility, it is especially adapted to curved

surfaces, and will readily conform to round columns not under 4 in. diameter. The lath is said to be especially adapted to stucco work. It is light and easily handled, can readily be cut to any size with a hatchet, and has no sharp edges to tear or cut the hands.

The prominent feature of the exhibit of the Ideal Concrete Machinery Co., 1310 Monmouth Avenue, Cincinnati, Ohio, were the "Ideal" Cincinnatus concrete



New Goods at the Cement Show—Fig. 11—View of "Ideal" Cincinnatus Concrete Mixer

mixers, of which the No. 7 Batch mixer, with power side loader equipment, automatic water tank, etc., is shown in Fig. 11 of the cuts. This mixer is designed to meet the requirements of the general contracting business, and although it is a very compact and convenient machine to use it is durably constructed and a machine that can be depended upon to turn out good concrete without the troubles that are incidental to operating the average cheap mixer. Cincinnatus mixers are made in four sizes, having loose material capacities of 5, 7, 10 and 14 cu. ft., and are made in equipments with wheelbarrow hoppers, batch hoppers, power side loaders or for rear discharge and paving work.

The Atlas Engineering Co., Milwaukee, Wis., has a new concrete mixer, which is said to be the only one having a seamless pressed steel drum. This mixing chamber is narrow and high and has rounded edges, which keeps the batch in the center of the drum directly over the tracker wheels and gives an equal distribution of weight over the four wheels and their bearings. The drum is built of Bessemer steel with a uniform thickness throughout, a feature which is said to make this part of the equipment 500 to 1000 lb. lighter than other drums having the same capacity. It has dimensions of 28 in. wide and 39 in. high, with openings of 15 in. diameter for the loading and discharge of the material. The mixer has a capacity of 7 cu. ft. and is provided with a rapid loading skip. The chain drive is used on this mixer. The tracker wheels are built of chilled semi-steel castings with ground surfaces on which the drum revolves, assuring a smooth and true running of the drum and requiring a minimum of power. The mixer is furnished with steam, electric or gasoline engine. The top of the engine into which the water is poured in is extended through the roof of the metal housing, making it easy to fill. The housing protects the engine, tool box and battery box from dust and dirt, and may be locked for protection when the mixer is not in use. The equipment is 6 ft. 4½ in. high. Wheeling planks and a loading platform are furnished if desired, the latter extending the full length of the machine with capacity to hold from 50 to 100 bags of cement.

The ordinary charging chute is supplied with this mixer. The "Atlas" material hoist can be attached to the side of the mixer and is operated off the main drive shaft by beveled gears which reduces the speed of the hoisting drum so that its lifting power is tremendous. Thus, for a nominal charge, a contractor may have two machines in one. A batch hopper large enough to hold one complete batch is also part of the equipment. The hopper is separated from the drum by a steel slide which makes it possible to assemble a complete batch within the hopper while the drum is mixing. The mixer is equipped with either an open top or pressure type tank, and the latter is recommended as the more desirable of the two in that a predetermined volume of water may be delivered to the batch. The discharge spout, when in a discharging position, extends nearly across the inside of the drum, thereby receiving the material from the blades as well as the buckets, discharging the entire load in 8 seconds

The Schaefer Manufacturing Co., Berlin, Wis., occupied a large space in the Coliseum and displayed two new products—the "Berlin Six" concrete mixer and a portable woodworking machine. The former equipment has capacity for 4½ cu. ft. of mixed concrete, being of simple and durable construction. The mixing chamber is cone-shaped and has the bottom level, the top being inclined toward the discharge end. This drum is made of tank steel with cast semi-steel heads on each end. The concrete is mixed by blades which carry the material up and drops it down in another part of the drum. The company says that there are four mixing motions, which assures the contractor of using a first-class, well mixed batch. The discharge of concrete is controlled by a ring which operates a shutter. A heavy spring holds the shutter in place against the end of the drum, making it water tight, and the amount of material to be discharged can easily be controlled by the operator. The equipment has a 2½ hp. gasoline engine.

In the portable woodworking machine shown in Fig. 12 and just placed on the market, the main frame and table top form one unit, making a very rigid construction. The steel angle legs and lower steel frame are securely bolted to the table top, thus forming a complete box-like all-metal frame, no wood being used in the manufacture of the machine frame. The saw may be raised and lowered through the slot in the main frame by means of a handle and clam screw. This adjustment can be made instantaneously, without touching the belt-tightener, as it is self-adjusting. With this method of construction the company is able to cast the main bearing in a solid yoke, making it impossible for the bearing to get out of alignment. The machine is furnished with gasoline engine,

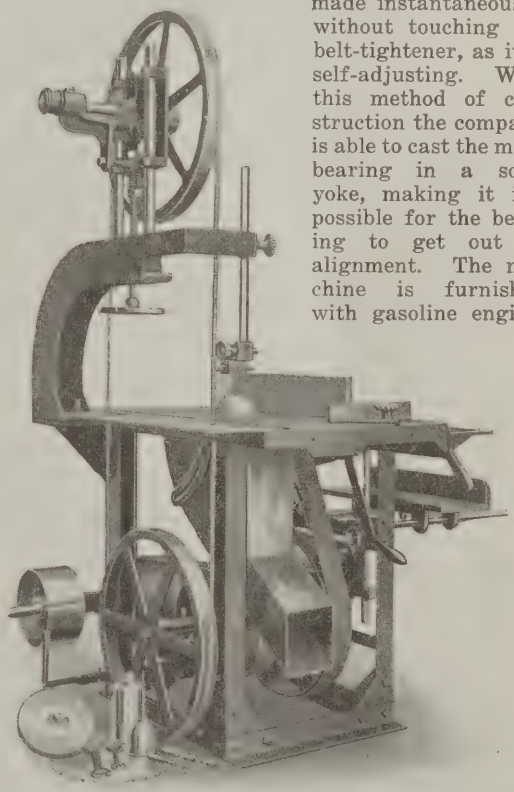
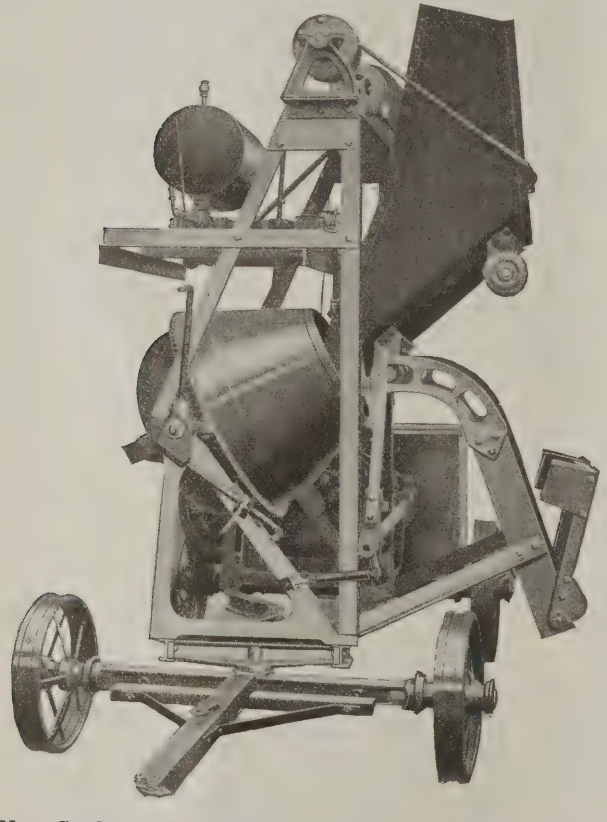


Fig. 12—The Schaefer Portable Saw Rig

electric motor or for belting to line shafting or an independent motor or engine. The equipment consists of a band saw, mortising machine, jointer, dado head, disk sander, emery wheel, molding attachment or sticker head, boring attachment and a ripping gage.

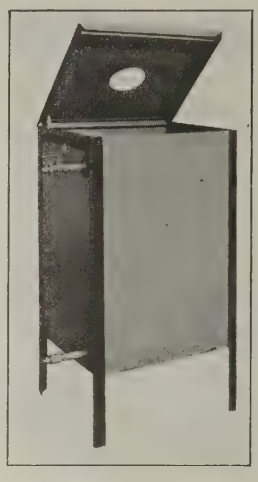
An excellent display of mixers, among which were to be found two new models equipped with track loaders, was that of the Waterloo Cement Machinery Corporation of Waterloo, Iowa. For mixers of this capacity the company claims that this is a new departure, as heretofore only the large and expensive machines have been provided with these facilities. It is said that the track loader saves time because the travel is so short, and because, requiring much less power, it can be run faster with the same engine than the old type. As compared with old style loaders this enables the operator to handle more batches per hour, allowing the same time for mixing, or permits more time for mixing if the same number of batches per hour are handled. The truck rests on the ground, giving great rigidity to the equipment. It is hinged so as to fold back out of the way when moving the mixer, as shown in Fig. 13. It can also be extended so as to load the scoop below ground level. Models 15 and 17, having respective capacities of unmixed material of 5-6 and 7-8 cu. ft., are identical in construction and operation, with the exception of the methods of tilting. In model 15 the drum is tilted by levers because of the

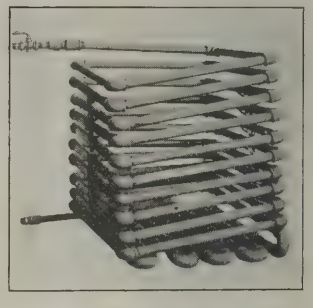


New Goods at the Cement Show—Fig. 13—New Model of Waterloo Concrete Mixer

comparatively light load, while in the case of the model 17 size this is done with a hand-wheel and back gear to offset the increased weight of the load. The discharge in either case is easily controlled, and a small or large quantity of material can be discharged as required. The drums revolve at the rate of from 14 to 18 r.p.m. The drums are so constructed that the mix is visible at all times, and the blades are so arranged that the ingredients are well mixed. An important and exclusive feature of the drum is that of adjustment to different pitches, or tilts. This is to accommodate it to the desired consistency of the mix, and the change of pitch can be made in a moment by means of a simple adjustment on the hub of the tilting levers.

The C. A. Londelius & Sons Co., 847 West 63rd Street, Chicago, Ill., exhibited for the first time a contractor's portable water heater, Fig. 14, an equipment especially designed for the mixing of concrete and mortar in zero weather. The heater consists of 100 ft. of 1 in. galvanized iron pipe arranged in coils as shown in Fig. 15. It will be seen that the pipe runs around four sides of the heater and also forms the grates, on which either a wood or coke fire may be built. This feature brings all of the exposed pipe surface in contact with the fire, thus a high rate of efficiency is assured. The pipes are enclosed in a substantial salamander, which has its corners reinforced with angle iron to insure a substantial and rigid outfit. The equipment stands about 4 ft. 6 in. high and is 24 in. square. The salamander is finished in white on the outside, and the





Figs. 14 and 15—Contractor's Portable Water Heater

cover likewise, the latter having a 6-in. opening in the center. It weighs complete approximately 250 lbs.

The Cummings Machine Co., Minster, Ohio, occupied a booth in the Armory for the purpose of demonstrating the new features in its small concrete mixer. General Manager E. C. Cummings called attention to the fact that the equipment is well adapted to the needs of both large and small contractors, and this prompted the adoption of the slogan "Get a mixer you can afford to use on every job." In Fig. 16 is shown a very compact and portable equipment—one that should appeal more especially to contractors who are often called upon to undertake work many miles from town. The mixer weighs 324 lbs. and mounted on a truck, with engine, 1000 lbs. It has a capacity of 2½ cu. ft. of loose materials. The mixer is somewhat different in construction and operation from the majority on the market. The loading hopper is directly above the mixing chamber, and the batch is dumped by a lever at the side of the machine. The batch is thoroughly mixed by ten mixer blades, operating fifty revolutions per minute, and this is materially assisted by the patented cylindrical mixing



Fig. 16—Front View of Cummings Concrete Mixer

chamber. It will be seen that the mixer is mounted on the rear end of the truck and may be readily placed to discharge directly into forms. This method dispenses entirely with the wheeling of mixed materials. The mixer may be operated by a gasoline engine of from 1½ to 3 hp., and when mounted on a truck occupies a space measuring 5 x 7 ft.

Concrete House of Hollow Wall Type

A Form of Construction Which Gives an Air Space Continuous in Outside Walls from Cellar to Roof

AMONG the building improvements lately carried out in one of the important cities of central New York was the hollow wall concrete house which constitutes the basis of the illustrations upon this and the page which follows. It is a two-story affair, and during the course of construction it attracted a great deal of attention, not only on the part of architects and builders who chanced to pass the scene of operations, but also the curious public, owing, no doubt, to the fact that it was the first hollow wall concrete house erected in that city. As a consequence of this, the builders doing the work secured a number of contracts from people who became interested in the development of this residence. The practical man appreciated almost at a glance that the method of hollow wall construction involved a number of very desirable features, and that it gave a house which was much warmer in winter and cooler in summer than would otherwise be the case. In connection with a private dwelling the economy of heating is always an important factor, and anything which will tend to reduce the coal bill seldom escapes consideration.

An examination of the floor plans on the following page shows a compact arrangement and a form of house which is economical of construction—that is, the outline is practically square, which avoids the necessity of having rooms of all sorts of irregular outline. From an open porch one enters the main hall, from which rise the main flight of stairs landing nearly in the center of the building on the second floor. The stairs are lighted at the first landing by an outside window. At the right of the main entrance and under the stairs is a coat closet. At the left of the hall is the living room, the striking feature of which is the open fireplace with bookcases at the left. Beyond the hall is the dining room, and at the left of it, reached through a commodious pantry, is the kitchen. Out of this opens a cold closet and also the stairs leading to the cellar. The sink is placed between two windows with the drainboard directly under one of them, thus affording ample light.



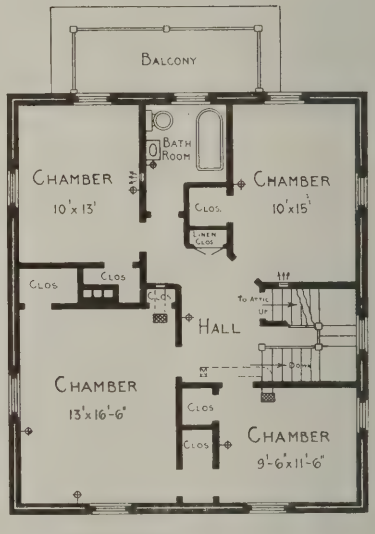
A Concrete Dwelling in Birmingham, N. Y., of the Hollow Wall Type—S. O. Lacey, Architect

The outside walls of the house are composed in reality of two 4-in. concrete walls separated from each other by a continuous air space 2½ in. wide. These walls are tied together across the air space every 2 ft. horizontally and every 9 in. in height by means of wall ties. In stuccoing the exterior walls the contractors used cement paste applied with a whiskbroom in such a way as to give a rather pleasing effect. The roof of the building is covered with unfading green slate.

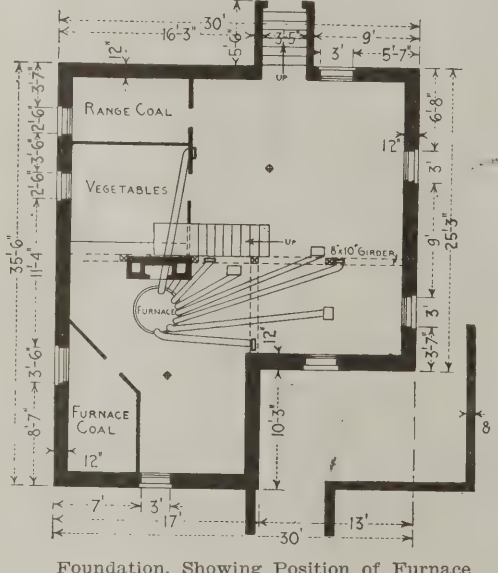
An interesting feature in connection with the interior finish is the wall decoration. The dining room, the living room, and the reception hall are glazed in imitation of leather, which gives not only a pleasing effect but also a sanitary and durable finish. The point is made by the architect that an interior decoration of this kind will last indefinitely and requires nothing except soap and water for the next ten or fifteen years. The walls of the bed rooms are finished in deli-



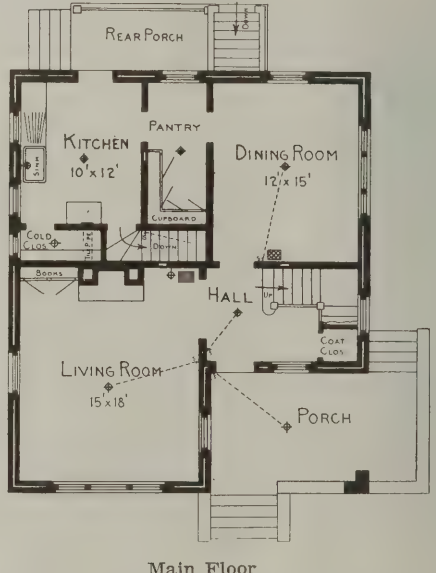
Front Elevation—Scale 3/32 In. to the Foot



Second Floor



Foundation, Showing Position of Furnace



Main Floor

Concrete House of the Hollow Wall Type—Floor Plans—Scale 1/16 *Inch to the Foot*

For outside trim cypress was used, treated with tobacco brown creosote stain and then wiped.

The interior woodwork of the house is of clear basswood finished in white enamel with mahogany doors throughout except in the kitchen and pantry, where they are finished in North Carolina pine. In doing the work what is known as "Chi-namel" was used with excellent results.

cate tints with "Chi-namel," dull wall finish.

The residence here shown was erected in Binghamton, N. Y., for H. C. Lawrence at a cost of about $4,500. The plans were prepared by Architect S. O. Lacey of Binghamton, N. Y.

The system of construction used was that of the Van Guilder Hollow Wall Co., 712 Chamber of Commerce Building, Rochester, N. Y.

Current News of Builders' Exchanges

Annual Meetings with Election of Officers for 1916—Banquets of Various Organizations

Annual Banquet of Worcester Exchange

MEMBERS of The Builders' Exchange of Worcester, Mass., held their annual banquet in the large ball-room of the Bancroft Hotel on the evening of March 7, and it was by far the best in the history of the organization. Covers were laid for 275 and only a few vacant chairs were noticeable.

President Geo. W. Kilmer presided and introduced as toastmaster F. L. Powers of the F. E. Powers Company—"what's the matter with Link? He's all right."

Among the invited guests present were the Hon. Geo. M. Wright, Mayor of Worcester; Geo. C. Halcott, Superintendent of Public Buildings; W. T. Morley, president Worcester Chamber of Commerce; W. J. Conlon, General Secretary Worcester Chamber of Commerce; J. W. Higgins, president of the Metal Trades Association; D. Tulloch, Secretary of the Metal Trades Association; ex-Senator A. S. Pinkerton, and Dr. I. N. Hollis, President of the Worcester Polytechnic Institute.

Dr. Hollis delivered a very able, interesting and instructive address, taking as his subject, "Can International Law Be Maintained Without a Navy?"

The speaker of the evening was Dr. Willard Scott of Brookline, Mass., who has no superior and few equals as an after dinner speaker. His address, thoroughly saturated with wisdom and common sense, was made doubly interesting by timely witticisms.

In September of this year the organization will celebrate its twenty-fifth anniversary as an incorporated body and preparations are already under way to make the occasion one long to be remembered. The officers for 1916 are:

President.....Geo. W. Kilmer
Vice-President.....H. C. Wilson
Treasurer.....A. P. Robbins
Secretary.....A. H. Skillings

The Builders' Exchange of San Francisco

The Builders' Exchange of San Francisco, Cal., recently held a meeting for nomination of directors for the ensuing year, and the election will be held shortly. At the meeting definite form was given to a movement that has been under way for some time, to consolidate two of the building trade organizations, as it has been felt that the functions of the Builders' Exchange and the General Contractors' Association might be better performed by one organization. The Builders' Exchange is now in excellent shape in every way, having some 500 members, no heavy liabilities, and a good sum of money in the bank, while its building has been fully paid for, and will bring a return when turned over to the owners of the lot when the lease expires. Though unpretentious, the Exchange quarters are very convenient and well located, and are used to the fullest extent by the members.

Banquet of Pittsfield Master Builders' Association

The tenth annual banquet of the Master Builders' Association of Pittsfield, Mass., was held Feb. 17 at the New American House when covers were laid for 101 members and guests. After a somewhat elaborate *menu* had been properly considered, the speakers of the evening were introduced in well chosen words by Frederick G. Rice, president of the association. The address of the evening was by ex-City Solicitor M. B. Warner, who in the course of his remarks touched upon unpreparedness, pointing out that unless the Master Builders were prepared they would be unfit to meet the boom of prosperity which he regarded as rapidly approaching. Mr. Warner was followed by Librarian H. H. Ballard, who dealt largely upon the subject of the Public Library, otherwise known as the Berkshire Athenaeum and Museum. He stated that he had lived in Pittsfield as librarian for a little over twenty-eight years and regretted to state that there were many men in the city who were not aware that a public library existed. Almost every man who did pay a visit to the building expressed surprise that there were so many books on architecture, building, plumbing, interior decorating and furnishing, bricklaying, civil engineering, electricity, etc.

During the evening the Berkshire Glee Club rendered an excellent musical program.

Officers of Hartford Builders' Exchange

The Masons' and Builders' Exchange of Hartford, Conn., has recently organized with the following officers for the ensuing year:

President.....Robert H. Fox
Vice-President.....Dominick Tremonte
Secretary.....Francis Hendron
Treasurer.....Thomas Wester

The meetings are held each week in Odd Fellows Temple and at present there are thirty-five concerns represented in the membership.

Jacksonville Exchange Affiliates with Chamber of Commerce

A meeting of the members of the Builders' & Traders' Exchange of Jacksonville, Fla., was held on the afternoon of Feb. 29, when it was unanimously decided to affiliate with the Jacksonville Chamber of Commerce. The headquarters of the Exchange has been changed to the Chamber of Commerce Building.

Banquet of Lansing Exchange

The members of the Builders' & Traders' Exchange of Lansing, Mich., enjoyed their third annual banquet at the Chamber of Commerce on the evening of March 1, when nearly 125 were present. Peter Gray acted as toastmaster and his humorous remarks added greatly to the good fellowship which generally prevailed. After the many good things provided by the entertainment committee had been duly considered, Hugo Delfs gave a talk on "Fire Prevention" in connection with which he dwelt at some length on the new Building Code now in course of formulation. He was followed by Frank L. Dodge of the State Consultation and Mediation Board, who had for his subject "Lansing." He told something of the history of the city and outlined some of its future prospects. President C. S. Wilcox of the Associated Builders' Exchanges of Michigan spoke on the subject, "Why Builders' and Traders' Exchanges?" He outlined the past achievements of the State Association and emphasized the fact that self-protection was the keynote of the Association's existence.

The Exchange has been moved into its new quarters on East Michigan Avenue, and has planned to add a businessmen's luncheon, reading rooms, billiard rooms and other club features if there is enough interest displayed to warrant the expense.

Brief Review of the Building Situation

Building Operations for February in 97 Cities Show an Increase of 17.5 Per Cent Over February, 1915

THE striking feature of the present building situation is the showing of the eastern section of the country in the planning of new work, as compared with a year ago, largely due to the heavy shrinkage reported by four out of the five boroughs of Greater New York. Not a little building work however has been held in abeyance, if not altogether abandoned, by reason of the tremendous advance in prices of all forms of structural steel, brick and other building materials, although in some cases plans have been further modified so as to use concrete. Notwithstanding this condition, however, reports from ninety-seven cities for February show an increase of 17½ per cent over the same month last year. Of the number reporting seventy-three show increases and twenty-four decreases.

Of the four sections or zones into which we have divided the country, the eastern cities show a loss of 3.15 per cent as compared with February, 1915, there being thirty-five cities reporting.

CITIES OF THE EASTERN STATES

	February, 1916	February, 1915
Albany	$169,230	$277,115
Allentown	192,000	85,335
Boston	4,591,000	3,587,000
Bridgeport	648,900	237,495
Buffalo	684,000	307,000
East Orange	31,325	182,607
Elizabeth	87,106	40,184
Harrisburg	31,460	38,425
Hartford	387,820	151,600
Holyoke	51,500	4,560
Irvington	62,440	16,125
Jersey City	284,523	319,154
Montclair	26,725	65,926
Manchester	125,055	40,065
Newark	246,838	955,391
New Haven	352,040	674,855
New York:		
Manhattan	3,452,130	5,899,930
Bronx	1,649,457	2,657,934
Brooklyn	3,296,370	2,264,550
Queens	1,455,186	1,582,125
Richmond	96,805	151,379
Paterson	85,447	57,537
Philadelphia	2,437,750	2,574,730
Pittsburgh	1,321,686	608,644
Portland	50,585	18,100
Rochester	691,433	382,607
Scranton	118,817	43,545
Schenectady	21,476	3,825
Springfield	470,185	692,795
Syracuse	115,577	160,383
Troy	14,445	47,445
Utica	226,175	7,975
Wilkes-Barre	36,748	70,125
Worcester	174,473	104,220
West Haven	42,055	30,055

From the middle section of the country thirty-one cities reporting show twenty-four increases and seven decreases with the resultant gain over February last year of a trifle more than 30 per cent. Largely increased activity is to be noted in Chicago, Detroit, Milwaukee, St. Louis and Toledo.

CITIES OF THE MIDDLE STATES

	February, 1916	February, 1915
Akron	$435,575	$110,260
Cedar Rapids	38,000	133,117
Canton	356,675	317,825
Chicago	7,354,200	4,701,400
Cincinnati	596,120	499,645
Cleveland	1,552,725	1,733,925
Columbus	314,225	153,350

CITIES OF THE MIDDLE STATES (Continued)

	February, 1916	February, 1915
Dayton	99,749	14,453
Des Moines	67,000	65,145
Detroit	2,186,960	1,307,213
Duluth	172,172	89,647
Evansville	51,100	85,435
Fort Wayne	74,950	80,100
Grand Rapids	114,740	104,301
Indianapolis	406,531	307,750
Kansas City, Mo.	464,760	896,330
Lincoln	57,800	31,560
Milwaukee	753,990	409,056
Minneapolis	823,960	811,495
Omaha	815,692	84,120
Peoria	200,250	51,750
St. Joseph	82,190	18,751
St. Louis	1,180,334	701,062
St. Paul	426,694	797,054
Sioux City	569,400	36,150
South Bend	177,085	17,455
Springfield	137,300	65,900
Toledo	700,781	454,607
Topeka	10,575	37,607
Wichita, Kan.	81,550	64,825
Youngstown	85,675	79,650

There are nineteen cities reporting from the southern tier of states representing a gain of 35.6 per cent in the new work planned in February, as contrasted with the same month in 1915. Important increases are found in Baltimore, Louisville, Nashville and Washington.

CITIES OF THE SOUTHERN STATES

	February, 1916	February, 1915
Atlanta	$277,000	$471,961
Baltimore	1,952,667	983,136
Birmingham	150,965	136,710
Chattanooga	249,570	33,110
Dallas, Tex.	216,212	324,185
Greensboro, N. C.	33,350	23,200
Louisville	941,330	319,520
Memphis	205,565	101,735
Nashville	241,306	65,705
New Orleans	116,889	97,323
Oklahoma	62,580	42,780
Richmond	372,907	259,184
Savannah	96,520	74,010
San Antonio	84,110	113,595
Selma, Ala.	10,885	5,000
Shreveport	45,046	41,576
Tampa	75,385	58,055
Washington	1,124,300	890,838
Waco, Tex.	58,480	24,951

Coming now to the extreme western section of the country, and including the territory west of Denver, the twelve cities reporting show increased planning of work, the gain over February last year being 41.56 per cent.

CITIES OF THE EXTREME WESTERN STATES

	February, 1916	February, 1915
Berkeley, Cal.	$210,450	$93,600
Denver	472,380	165,070
Little Rock	67,061	37,095
Los Angeles	976,378	560,697
Oakland	338,336	328,934
Portland	406,615	311,740
San Diego	164,890	95,990
Salt Lake City	243,815	147,705
San Francisco	1,356,915	807,936
Seattle	598,615	353,880
Spokane	202,660	21,725
Tacoma	63,801	56,751

For the first two months of the current year there has been a gain of something like 20 per cent in the amount of new work planned, and as the spring season opens there is every indication of a most gratifying degree of activity the country over.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

"Buttonlath" Plaster Board

The great extent to which cement stucco has come to be used all over the country has created an exceptionally big demand for wood and metal lath and substitutes therefor. The ideal concrete-appearing building is, of course, the one that is constructed of solid concrete, or at least stucco over building tile, but a structure which shall have the same appearance and at the same time cost less is frequently found desirable. It is in such cases that stucco over lath or plaster-board is made to serve, and the success of such work naturally depends largely upon the stucco's foundation, although not a little upon the quality of the plaster itself.

There has been recently placed on the market a new plaster-board, called "Buttonlath," which is not only intended for exterior purposes but for interior work as well. It is a composition board made into sheets 24 x 32 in. in size and ⅜ in. thick. Because of its fibrous nature, it is readily nailed to the framing timbers, and it can be cut to any size with a saw or by drawing the blade of a hatchet or other sharp instrument across it and breaking over a straight edge. It is an easy matter to break joints by using half and quarter sheets. The appearance of "Buttonlath" applied to the interior of a room is shown in Fig. 1.

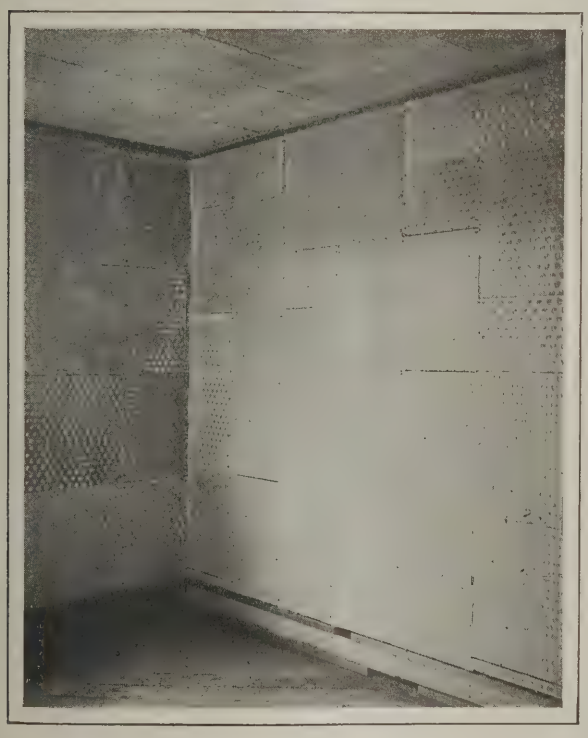


Fig. 1—Showing the Application of the Lath to the Walls and Ceiling of a Room

The important feature of this board is its mechanical keying system or bonding quality. The surface to which the plaster is applied is covered with indentations, in the center of which are set cement-composition buttons with flaring edges. These buttons are spaced, in stagger fashion, 1½ in. apart on centers, and number 530 to the square yard. Each of the buttons will sustain 50 lb. before breaking. The applied plaster is not only held by its grip under the edges of the buttons, but also is bound to the fibrous surface of the board by suction and adhesion.

Although there is no variation in sheet size or thickness, "Buttonlath" is really manufactured in two different grades—one for interior work, and the other for exterior purposes. The former is surfaced, on both sides, with a sort of paper pulp and the latter with a special 15-pound roofing paper. For exterior work, the board is also supposed to be covered with ordinary wire netting, of 16-gage and 2-in. mesh. This netting is nailed loosely to the surface, to act as a reinforcement for the stucco and to help in keying it to the board.

In some cases, "Buttonlath" is also used to form solid partitions, and for this purpose it may be had faced with buttons on both sides. For such construction, metal studs are used spaced 24 in. on centers and secured to the ceiling and the floor by ¾-in. steel channels or a galvanized runner, or by drilling into the concrete and springing steel studs into place. The boards are then set in place, and secured to the steel studs by nails, as in Fig. 2, which firmly wedge the boards together and make the structure rigid. The plaster is applied to each side of the partition, which is from 1½ to 2 in. thick.

One of the advantages of a plaster-board of this kind is that the plaster or stucco may be applied in a single coat, from ¾ to 1 in. in thickness. This means a considerable saving in time and labor. Of course, however, the finishing coat must be applied separately, but no surface need be gone over more than twice. Because of its composition, "Buttonlath" is more or less fire-retarding, is water-proof, a sound-deadener, and a heat-insulator. Since it is always rigid and affords a solid surface, the plaster is said to be less apt to crack than when metal or wood lath is used.

Although placed on the market less than a year ago, "Button lath" has been quite extensively used in southern California. It has been employed in the construction of residences, store buildings, apartment houses, etc. One of the most notable jobs for which it was used is the group of new high school buildings at San Bernardino, Cal., in which 360,000 sq. ft. of "Buttonlath" is used, it being employed for both exterior and interior purposes. It is manufactured by the Buttonlath Manufacturing Company, Central Building, Los Angeles, Cal.

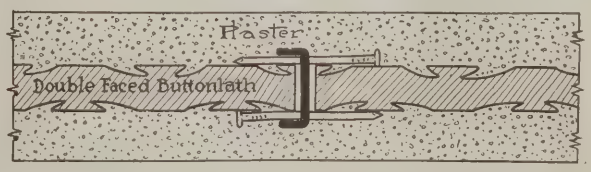


Fig. 2—Horizontal Section Through a Solid Partition

"Buttonlath" Plaster Board—Various Details of Interest to Architect and Builder

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The Hess Pipeless Furnace

Hess Warming & Ventilating Company, 1220-B Tacoma Building, Chicago, Ill., reports a very gratifying demand for its welded steel cottage furnace which was

brought out early last fall and which was illustrated and described somewhat in detail in these columns in September. The furnace is of the "pipeless" type, having a large register placed directly above it and the hot air rising through the center of this register. On each side of the hot air outlet is a cold air flue so that the cold air from the room descends to the bottom of the furnace casing and then ascends in contact with the heated surface of the furnace and escapes through the register as stated. The arrangement is such as to constitute a circulating system which rapidly changes the air in the room in which the register is placed as well as all rooms which communicate directly with that room. The heaters are sold on trial and special terms are made to contractors which enable them to handle the furnace business direct rather than through local dealers.

The "Hummer" Door Hanger and Track

One of the latest additions to the assortment of barn equipment which is manufactured in great variety by the J. E. Porter Company, Ottawa, Ill., is a new barn door hanger tnd track known as the "Hummer." It will be seen from Fig. 3 of the illustration that the track is made of one piece of No. 14 gage steel and is formed in such a manner as to give the maximum strength. This single piece of steel constitutes the cover and track complete, no rivets or brackets necessary, and the joint clamp is so arranged as to make a continuous track. The wheels of the hanger run in the V-shaped base of the track, the contact being with the sides of the groove rather than *in* it, thus reducing the point of contact to a mimimum and practically eliminating friction. The appearance of the hanger in the groove is shown in Fig. 4 which represents a vertical cross-section through the door and track. The construction is self-centering, the wheels running perfectly true

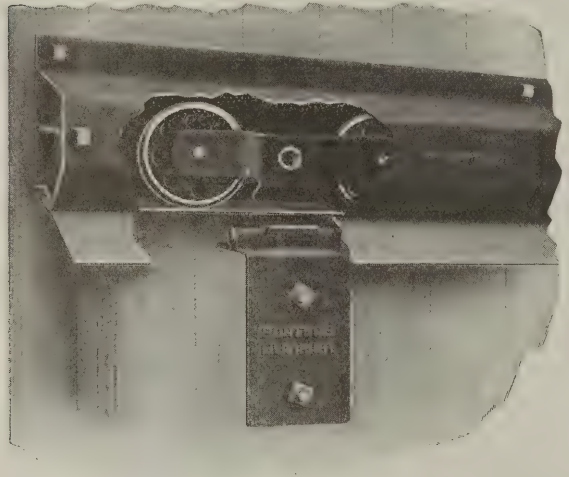


Fig. 3—Broken View Showing Hanger in Position

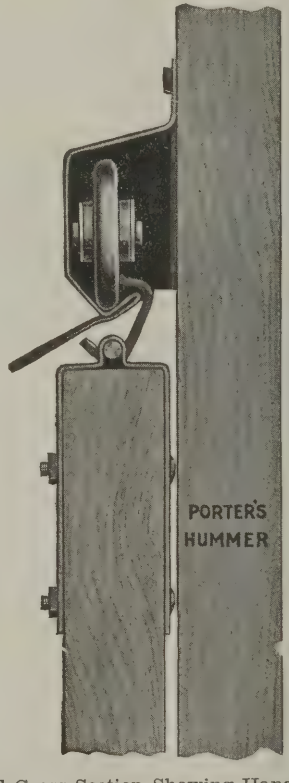


Fig. 4—Vertical Cross-Section Showing Hanger in the Groove

The "Hummer" Door Hanger and Track

regardless of the angle of the door. It will be seen from the picture that the door is completely protected from the weather as is also the hanger and its mechanism. The track is furnished in 6, 8 and 10 ft. lengths with all joint clamps and a lag screw every 12 in. The hanger is a steel tandem, the wheels being large and having roller bearings. The construction of the hanger is such that the wheels cannot jump the track. It is made in adjustable and non-adjustable types so as to meet varying requirements.

Elgin "Nu-Wa" Sanitary Trim

One of the latest candidates for popular favor in the way of exterior and interior trim is the product which is being brought to the attention of architects, builders and owners by the Elgin Nu-Wa Metal Trim Company, Excelsior Springs, Mo. This trim and base cap are constructed of a series of galvanized sheet steel of No. 26 gage or cold rolled drawn through sharp straight dies. The exterior faces of the metal trim can be varnished, painted or stained to give the appearance of various kinds of wood according to requirements. This construction is referred to as fireproof as well as inexpensive and durable. It is of such a nature that it can be applied with hammer and nails—no special tools being required. The use of the material insures close fit between the trim and the walls and in plastering it makes a positive joint. The sanitary "Nu-Wa" trim and base cap has been designed primarily to reduce the cost of interior and exterior finish, and is especially adapted for use in connection with hospitals, colleges, schools, public, commercial and industrial buildings, bathing establishments, etc. The company has issued an architectural catalog giving many interesting facts concerning the advantages of the Elgin "Nu-Wa" method of construction using the metal trim and base cap both for interior and exterior finish.

Use of Mineral Wool in Architecture

The use of mineral wool for filling the outside walls of residences and the space between rafters of buildings of all kinds for the purpose of protection against heat in summer and cold in winter is rapidly growing as the merits of the material become better known. The material is also used for deadening sound and fireproofing, and as there is nothing organic in its composition to decay or become musty—being manufactured from blast furnace slag—it is well adapted for the purposes for which it is recommended. Many interesting details as to the manner in which Mineral wool can be utilized to the best advantage and illustrations showing just how the work is done are contained in an attractive pamphlet sent out by the United States Mineral Wool Company, 140 Cedar Street, New York City. Mineral wool is now made by a new and improved process and as a consequence the quality of the material is much enhanced as regards strength of texture, lightness and freedom from dross over that hitherto made. Accompanying the pamphlet is a folder telling how to keep out the heat in summer and keep

(*Continued on page* 88)

Fiberlic for Walls and Ceilings



What Do You Know About Wall Board?

DO you know which has the greatest elasticity, tension or sheer strength? Which reflects heat? Or which is odorless, vermin-proof, fire-resisting, etc.?

When you specify FIBERLIC Wall Board for any of its manifold uses, you can be sure that it is way ahead of ordinary wall boards in all these qualities.

All FIBERLIC tests place it in a class by itself, because it is the only chemically treated, **long-fibered** board on the market.

To the wide-awake man practicing the profession of building, we submit FIBERLIC as a material for interior finishing, more economical than lath and plaster and for very many purposes more suitable and practical.

Samples and full technical information on request. Also ask about the special FIBERLIC paints that come in 24 different colors and shades.

THE FIBERLIC COMPANY, CAMDEN, N. J.

LONDON (England) BRANCH: MacAndrews & Forbes, Ltd., Finsbury Court, Finsbury Pavement, E. C.



"Colonna" Bath, Plate No. K-64
"Bretton" Lavatory, Plate No. K-580

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Trade-marked, Enameled Plumbing Ware an expression of artistic beauty

KOHLER BATHTUBS, lavatories and sinks are modern and hygienic in design.

THE PERMANENT trade-mark in the enamel is our guarantee of the highest quality and *your safe guide* in selecting plumbing ware.

KOHLER ENAMEL is noted for its pure whiteness. Houses and apartments equipped with KOHLER plumbing fixtures have added value and attractiveness.

THE "VICEROY," our new one-piece, built-in bathtub, is specially low-priced due to manufacturing economies. Its many attractive features make it widely popular.

WRITE for the "Viceroy Book." It describes this beautiful built-in tub, which is made in patterns suitable for every installation.

MAKERS OF Trade-marked Enameled Bathtubs, Lavatories and Sinks.

"It's in the Kohler Enamel"

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Founded 1873
Kohler, Wis., U.S.A.

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Boston
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Chicago
San Francisco
London

it in during the winter months. In other words, the matter constitutes a chapter on the insulation of dwelling houses.

Laying Shingles to Give the "Thatched" Roof Effect

Some very interesting literature bearing upon the above subject is being sent out by the Standard Stained Shingle Company, 1030 Oliver Street, North Tonawanda, N. Y. There is an instruction sheet giving details including sections and elevations of portions of a roof together with explicit directions as to the proper method of laying "Creo-Dipt" stained shingles in order to give the wavy thatched effect to a roof. The shingles in question are furnished for this sort of work ready for instant application. The butts are sawed in the proper manner, while for dormers, valleys, hips, and gable ends, the shingles are bent with the grain, and for the eaves they are bent across the grain. The company recommends the use of "Creo-Dipt" 16-in. extra clears for the thatched effect as they lend themselves particularly to the processes required for this work, and the company points out that since the exposure is less than for ordinary roofing purposes they are more economical and better adapted. With the instruction sheet is a handsome folder entitled "Thatched Effect," which is illustrated by means of numerous halftone engravings of attractive residences, the roofs of which have been covered with the company's stained shingles, so laid as to give the effect described. The company states that during the past four years it has made exhaustive experiments and has furnished "Creo-Dipt" stained shingles for many fine houses throughout the country for thatched roofs and with very satisfactory results. The company calls attention to the fact that its Service Department is at the disposal of architects and contractors and the suggestion is made that blue prints and specifications be sent the company for thatched roof work. The Service Department will offer suggestions as to radius, best grade and colors to use, as well as many other things which will materially aid the inquirers in producing the best and most artistic results.

A New Plasterer's Trowel

A copper-plated plastering trowel, which is referred to as a great improvement over the old-style polished steel trowels, has just been placed upon the market by



Fig. 5—General View of New Plasterer's Trowel

the Nicholls Mfg. Company, Ottumwa, Iowa, and a general view of which is presented in Fig. 5. This new trowel is so made that it will not rust and will prove very durable. It is made of the finest quality ofcrucible spring steel, with blades and mountings full polished and copper plated. It is substantially constructed with flexible blades, straight edges, perfect hung, light weight and secured with ten and twelve rivets.

Catalog of Sheet Metal Building Materials

There has just been issued from the press by the Willis Mfg. Company, Galesburg, Ill., a very attractive catalog of sheet metal building materials which is being distributed to those making application for it. The work is known as "Catalog No. 7," consists of 170 pages and presents numerous illustrations with descriptive text of metal windows, tin clad doors, shutters and fixtures, all bearing the underwriter's label. The point is made that these products are such that every community can use them satisfactorily for the reason that they reduce insurance charges, assist in protecting property from fires in adjoining buildings, and while

(*Continued on page* 90)



Residence of C. H. Wilson, Wilton Junction, Iowa. B. W. Gartside, Davenport, Architect. Neponset Twin Shingles furnished by Wilson Lumber & Fuel Co. and applied by W. A. Grunder.

"I am the Neponset Man"

"They called me that at first to 'jolly' me.

"They didn't believe I had shingles that couldn't crack, rot, rust or rattle loose.

"But now the name Neponset is my capital. The first job where I used

NEPONSET SHINGLES

broke the ice for me. That one job led to a second, and the two soon became four. And so my business grew. "Every one of these red and gray roofs here in town is mine. And many of the others, too, for I got a reputation as a roofer on account of my success with Neponset Shingles."

The same materials are used in Neponset Shingles as in the well-known Paroid Roofing. Neponset Wall Board, Neponset Waterproof Building Paper and Neponset Floor Covering are other well-known Neponset products.

Why Not Make Every Room Habitable?

Almost every home builder economizes somewhere. Often a room is left unfinished. In such a case you can give that extra bit of service that is so well appreciated.

Recommend that it be finished with

NEPONSET WALL BOARD
FOR WALLS AND CEILINGS

There are two finishes, waterproofed to prevent warping.

If you do not know Neponset Wall Board you can not know the possibilities that lie in this substitute for lath and plaster. Let us send you a sample. Details are given in "Repairing and Building," but you should examine the board itself.

Mail your request to-day.

We want a carpenter in your town to be known as the "Neponset Man." Will you be the one? Send coupon today for particulars.

BIRD & SON, Established 1795, **Department B, East Walpole, Mass.**

COUPON

BIRD & SON, Dept. B, East Walpole, Mass.

Please send me information about Neponset Shingles and Neponset Wall Board. Also a copy of your book, "Repairing and Building." This request, I understand, does not put me under any obligation whatsoever.

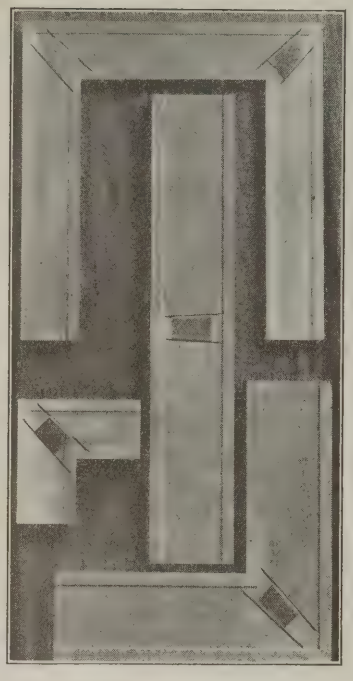
Name .....

Address .....

COUPON

"Keystone Lock Joint Clamp"

Patent applied for



These clamps are made from high grade spring steel, with convex face and acute angled flanges, which engage corresponding grooves formed in backs of the parts to be joined together, as shown in illustration.

When driven in place, the clamps, owing to their compensating spring construction, exert a constant pressure on the edges so joined together, making a joint which remains tight under all changes of climate or temperature.

To secure the best results, specify and insist upon the use of the "Keystone Lock Joint Clamp" on all mitre trim joints.

We use the "Keystone Lock Joint Clamp" on all our erected trim without any additional cost to our Customers, giving them, as always, MAXIMUM VALUE AT MINIMUM COST.

HYDE-MURPHY COMPANY

Ridgway, Pa.

New York Office
10 East 43rd St.

Pittsburgh Office
Liberty Bank Building

FIREPLACE MATERIAL

Every Contractor



building fireplaces should know the advantages of the Stover Dome Dampers.

The rod extends out under the brick or tile so there is no interference after the Damper is first set. Wide flanges allow giving sides of Fireplace any angle desired. Cover will not slip out of position. Castings are extra strong. Made with or without angle for carrying brick. We make other styles.

Catalog No. 1550 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets. Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches. Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

SEND COUPON TODAY

Stover Mfg. Co., 747 East St., Freeport, Ill.

Send the undersigned information regarding your

Name.....

Business.....

Address.....

Stover Mfg. Co.

747 East St.

Freeport, Ill.

they are more generally used in the larger cities they can be profitably utilized in the smallest village because the latter usually does not possess the fire fighting apparatus and night watchman service that is to be found in the more popular places. The small additional cost of fireproof windows and doors as compared with ordinary construction give the former a value that cannot be estimated in dollars and cents. The catalog also illustrates and describes skylights and ventilators, all grades of roofing and roof finishes, shows numerous styles of metal ceiling as well as gutters in standard sizes and design. The new catalog measures 8½ x 11 in. in size, and its arrangement is such as to render it a ready reference book for the builder and the sheet metal worker.

Kaustine Sewage Disposal

An attractive pamphlet of sixteen pages profusely illustrated with halftone and line engravings, all relating to the Kaustine system of sewage disposal is being sent out by the Kaustine Company, Inc., Dept. B-1, Buffalo, N. Y., and with export sales office at 116 Broad Street, New York City. The system described is well adapted to dwellings, churches, hotels, schools, factories, and in fact to all the toilet requirements of unsewered districts in village or country. The features of the scheme of sewage disposal are the Kaustine closet system and the chemical germicide and solvent, "Kaustine." A description and specifications of the outfit are presented in a way to be readily understood and the plan of installation is simple and effective. The scheme most commonly used is that described in connection with the 1915 model. It is to locate the bowl on the first floor in a shed, back porch room, lean-to, or whatever room may be provided in the house. The tank is usually buried 10 in. under ground beneath the wall of the house, and the manhole for emptying and re-charging is thus outside. With each outfit specific instructions for installation are furnished. A feature of the pamphlet in question is a number of plans of schoolhouses showing suggested schemes for installations.

Montross Metal Shingles

We have just received from the Montross Metal Roofing Company, 108 Erie Street, Camden, N. J., a copy of an attractive catalog of Montross metal shingles and

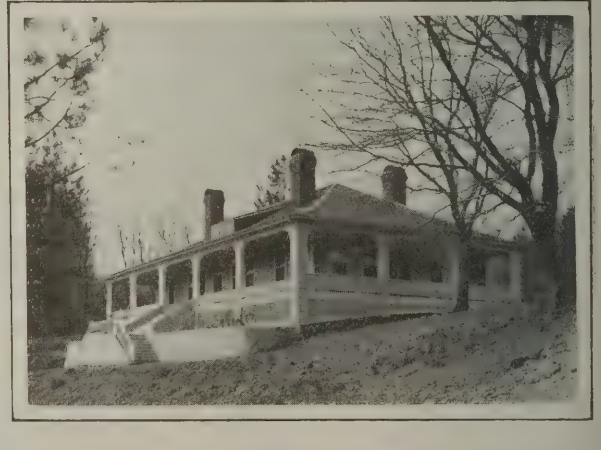
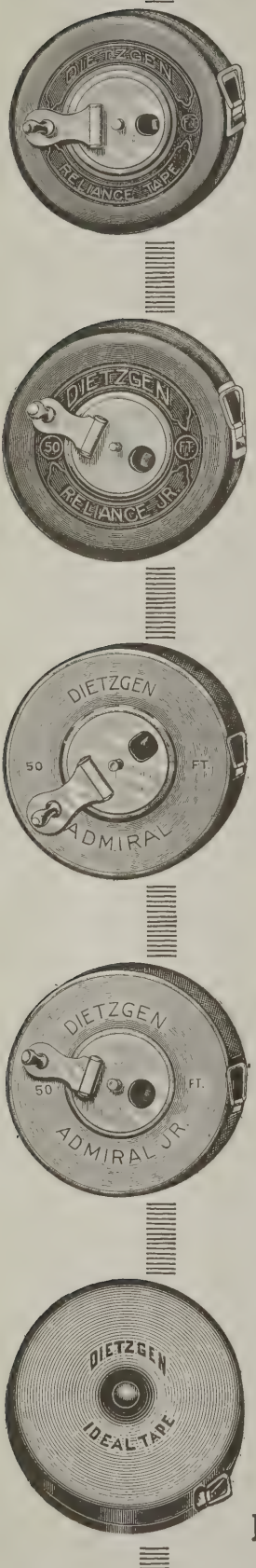


Fig. 6—Government Building at Baird, Cal., Roofed with Montrose Metal Shingles

roofing sundries, the salient features of these specialties being set forth in a way to command the attention of the architect, the builder, the roofer and the house owner, while numerous illustrations show the appearance of the various types of shingles produced, also some of the many buildings in connection with which the goods have been used. Directions are given for applying the shingles, and in addition reference is made to metal weather boarding either painted or galvanized, rock face siding and rock face stone siding stamped in metal in a way to represent the finish indicated. Interesting in this connection is the building pictured in

(*Continued on page 92*)


ALL'S
WELL
CORBIN
LOCKS



Any One of These 5 Tapes

the *Reliance, Reliance, Jr., Admiral, Admiral, Jr.,* and *Ideal* will save time and money for the builder by enabling him to obtain accurate measurements quickly. They are manufactured and sold under the absolute guarantee of

Dietzgen

the firm with the reputation for quality products.

Advantages

The cases are substantially made—insuring service. The handles are easily opened by pressing a direct acting button—rapid to operate. The division lines are on the top of the ribbons—convenient to see. The reading is seen *at a glance,* for in front of each inch number the foot number is shown—saves delay—mistakes. Illustration below explains.

Send for Tape Catalog "B"

EUGENE DIETZGEN CO.

Manufacturers

Measuring Tapes
Surveying Instruments
Drawing Materials

Chicago New York San Francisco
New Orleans Toronto Pittsburgh
Philadelphia

2021

Fig. 6, which represents the government residence at Baird, Cal., and which is roofed with Montross metal shingles. Supt. G. H. Lambson of the Bureau of Fisheries at Baird, states that the shingles are giving perfect satisfaction and in that climate where there are six months of hot weather without rain followed by a six months rainy season, they have proved, he states, to be much "superior to the best wood shingles." They were laid over the old wooden shingle roof and have rendered the house cool in summer and warm in winter.

New Hand Saw Files

Delta File Works, Philadelphia, Pa., are distributing among the trade an illustrated folder calling attention to the high-grade files which they are prepared to supply. In the list are three specials, known respectively as the "Carpenter Special," "Mechanic's Favorite," and "Expert's Choice." Each represents a special length, and is particularly adapted for filing hand saws. Being made of crucible steel with a deeper tooth and the correct angle that will insure the greatest efficiency, they are much longer than the usual shapes that have been used in this same cross-section or face of the file. The longer sweep of the files economizes the time of the user so that he is able to do a great deal more work in less time. The manufacturers call attention to the fact that if the goods, after fair trial, are not found satisfactory the money will be refunded.

The Neville Roofing Bracket

Carpenters and builders throughout the country are likely to be interested in a new roofing bracket covering which application has been made for a patent, and

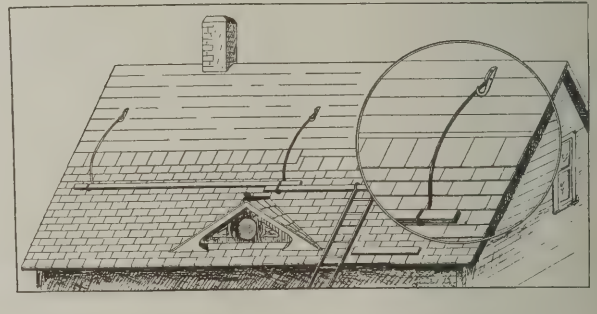


Fig. 7—The Neville Roof Bracket

which is now being placed on the market by the Neville Mfg. Company, 210 North Fremont Street, Kewanee, Ill. The bracket is intended to support the staging on the roof while work is in progress. It can be used over either wood shingles, metal, slate, composition or roofing in rolls. The device consists of a bar of soft steel 5 ft. 6 in. long and ⅝ in. thick made in the form of an arch so that the roofing may be laid under it while at its lower end it is looped to receive a 2 x 4 in. stud. The top end has a reversible hook which is designed to hook over the roof boards on an open sheathed roof. The flat end has a slot in it to hook over a 10d. or 20d. nail driven in the roof on a close-sheathed roof. The claim is made that the bracket may be used on any style of sheathing and is readily moved up as the work proceeds, thus always keeping the staging where it is most convenient to work upon. The company is sending out an illustrated circular setting forth the merits of the bracket and telling how to use it in connection with various kinds of roofs. The application of the device will readily be understood from an inspection of Fig. 7.

Lewis-Built Homes

A very attractive catalog which cannot fail to command the attention of every home-seeker in the country has just been issued from the press by the Lewis Mfg. Company, Bay City, Mich. It is a volume of 112 pages profusely illustrated with halftone engravings and plans of attractive homes, the building materials for

(*Continued on page* 94)



Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

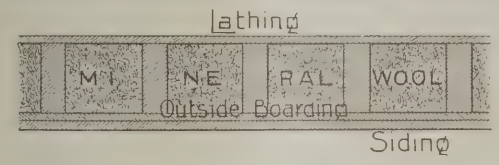
A. S. ALOE COMPANY, 625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

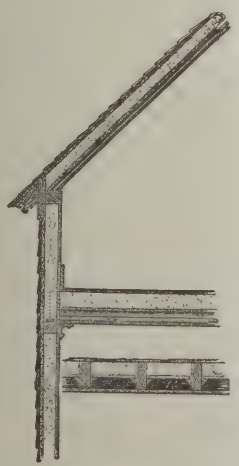
Name.....

Occupation.....

City..... State.....



Section of Outside Wall of House, Showing Wool Between Studding.



Section showing wool in outside walls and between rafters; also how placed above or between joists for deafening floors.

Write for Catalog A.

Section of Sound-Proof and Fire-Proof Partition. Can be used for outside walls also.



Mineral Wool for Building

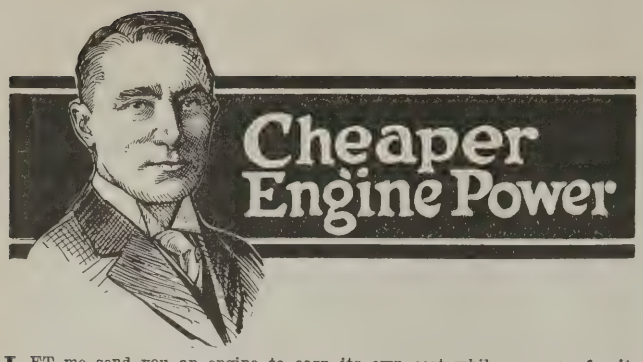
Mineral Wool has superseded all other materials used for similar building purposes because it does "a great work at little expense." A house lined with Mineral Wool has an indestructible, fire-proof and vermin-proof guard; it protects the entire household. In the winter time it keeps the cold air out, facilitating proper heating and economy in fuel. In the summer it keeps the heat out.

This material, being of fibrous, inelastic composition, acts as a deadener and muffles all sound. It is considered the best insulator material on the market, making it a perfect refrigerating machine.

Mineral Wool makes life-long friends of all its users. If you are skeptical as to its power, let us demonstrate. We can prove all claims. Write us to-day.

U. S. Mineral Wool Co.

140 Cedar Street New York



LET me send you an engine to earn its own cost while you pay for it. **Easy to start; no cranking**; easy to understand and manage; and easy to pay for on any suitable, reasonable terms of payment, during a year. I have helped many thousands to own engines in this way, during my 29 years of engine building.

WITTE Engines

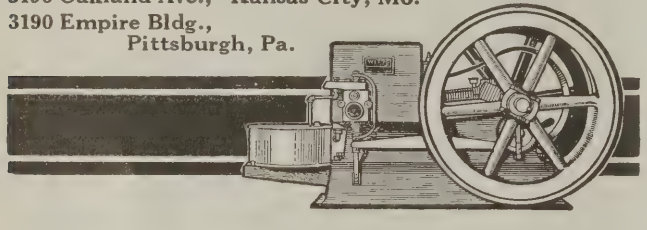
Gasoline, Kerosene and Gas

SEE THESE LOW PRICES: 2 H-P, $34.95; 3 H-P, $52.45; 4 H-P, $69.75; 6 H-P, $97.75; 8 H-P, $139.65; 12 H-P, $197.00; 16 H-P, $279.70; 22 H-P, $359.80. *(F. O. B. Factory.)* Portable Engines and Saw-Rig outfits proportionately low. **Guaranteed high quality**—as durable as superior design, best materials and workmanship can make.

Guaranteed 5 Years

Fine Book Free My book, "How to Judge Engines," will show you how to select the engine most suitable to your needs, and how easy it is to run a WITTE at any kind of work. Get my engine facts before you decide on any engine.

ED. H. WITTE, WITTE ENGINE WORKS
3190 Oakland Ave., Kansas City, Mo.
3190 Empire Bldg.,
Pittsburgh, Pa.



Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

which can be supplied by the company for the sum stated in connection with each design. The purpose of the book or catalog is to inform those who are intending to build homes how they can do so "by a better method than was thought possible prior to the perfection of the Lewis-built ready-cut system." The business of the company is selling houses direct to the builder and so prepare the lumber as to make the erection easy, economical and satisfactory. The point is emphasized that the company does not make what are known as "portable" houses, and it requests that Lewis-built homes be not confused with such. The many advantages of the Lewis-built method are presented as well as the way in which the reader can derive the most benefit from the catalog. Reference is made to the saving in time, labor and in the cost of material together with an enumeration of what is furnished for Lewis-built homes in the way of lumber, interior and exterior mill work, paint, stain, varnish, plaster and plaster board, masonry and complete plans and instructions. The company also furnishes a photograph of the house showing how it will look when completed. The publication is known as Catalog A-6 of One Hundred Homes, and we understand that a copy of it may be secured by any prospective builder upon application to the address given.

The "Universal" Hand-Block Belt Sanding Machine

Carpenters and builders who find hand finishing an expensive operation are likely to be interested in the new "Universal" hand-block belt sander illustrated in Fig. 8, and recently placed on the market by the Berlin Machine Works, Beloit, Wis. This equipment is said to speed up

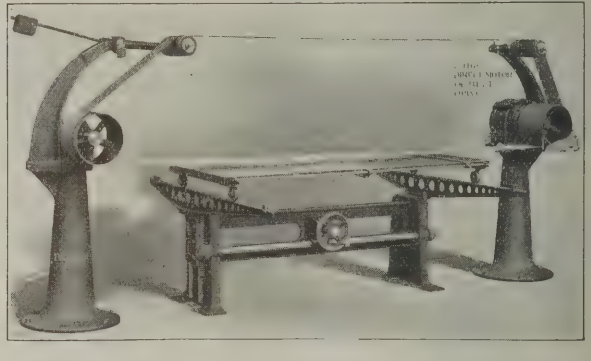


Fig. 8—The "Universal" Hand-Block Belt Sanding Machine

sanding jobs, insure a better and more uniform finish, to be an insurance against spoiled stock while adding profits and saving labor costs. The standard table is 80 in. long by 32 in. wide, and when the bases are set close up to the table the floor space occupied is about 5 x 10 ft. Where plenty of room is available the standards may be set 12 to 18 ft. apart. The machine is entirely self contained, has no complicated parts to get out of order and requires little power to operate it. One of the main features of this sander lies in its ability to handle material at great length and of exceptional thickness, as the pedestals can be spaced and the table lowered to suit requirements. Furthermore, with the pedestals set well apart an exceedingly flexible belt results, permitting manipulation to shapes of stock that a short belt could not accommodate. The work lays on the table always facing the operator as he brings the belt to the work. This enables him to see exactly what he is doing and insures the proper finish. Little effort is required to roll the table proper back and forth, as it is built very light but rigid and runs on nearly frictionless rollers. The table is raised and lowered by means of a rack and pinion at each end, giving a level rest and proper height to work for most convenient sanding. This adjustment is readily accessible from the operator's natural position, being controlled by the large center hand wheel through a worm and worm gear. The belt level is at the proper height to allow straight arm manipulation of the hand block, so that no useless effort is expended in getting the required pressure on the sand belt. This is important in eliminating strain when reaching over wide work and generally means greater output with less operative ef-

(Continued on page 96)



Architect—"Here is that job showing the new gray finishes that I've brought you over to see. It gives you an exact idea of the beautiful finishes that can be given to the woodwork of your new home."

Owner—"My, but they're fine—the best I've ever seen. How did you get them?"

Architect—"Easily answered. The Bridgeport people put out the *real* grays. I specified a coat of **Bridgeport Standard Acid Stain,** two coats of **Wonder Lac** and the result is just what you see here—certainly they're the slickest, clearest grays I ever laid eyes on."

Owner—"I happen to have some knowledge of wood finishing and I must say that I've never before seen what I called a good gray. They're all more or less of a greenish cast. How did you overcome that on this job?"

Architect—"You get a greenish cast when shellac and wax are used as a finish. There's just enough yellow in shellac to kill the delicate gray tint; but you see **Wonder Lac** is colorless, so it retains that beautiful gray tone which the stain gives to the wood."

Bridgeport Standard Gray Acid Stains are **real** grays. They give the most beautiful gray effects you ever saw.

But be sure to see that **WonderLac** is used over our acid stain—because **WonderLac,** being colorless, does not change the tint of the stains like shellac.

These new types of finishes are playing such an important part in attractive decorative effects that no architect, building contractor or home owner who desires his woodwork finished in the most artistic and practical manner can afford to neglect being fully posted about them.

We are ready to furnish sample panels and complete information.

The Bridgeport Wood Finishing Co.

New Milford, Conn.

Architectural Service Departments:

New York 6 East 39th St. | **Chicago** 78 W. Lake St. | **Boston** 8 Portland St.

Philadelphia: 12th and Sansom Sts.

FOR EVERLASTING CONCRETE WORK



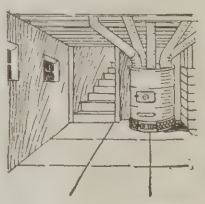


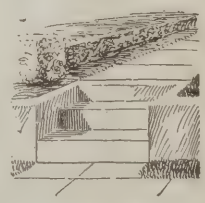
Millions of barrels of ALPHA, the Hourly-Tested, Guaranteed Portland Cement, have been used by the United States Government in building fortifications, sea walls, breakwaters, big dams, etc., and by other constructors in such great works as the Galveston Sea Wall, the New York Aqueduct, the Pennsylvania Railroad Terminal in New York, and many more notable constructions where concrete is called upon to meet the severest conditions.

ALPHA

The Hourly-Tested and Guaranteed Portland Cement

long ago displaced the best imported Portland Cements. Great builders have learned that ALPHA on a bag means something more than 94 pounds of Portland Cement. It stands for exact proportioning of superior raw materials, exceptionally fine grinding and thorough burning. In all ALPHA plants the chemists are supreme. They make hourly tests, to be absolutely sure of uniformity, fineness, and strength. Their strict system of tests insures that every bag of ALPHA sent out will bind with an everlasting grip. "Guaranteed"—now stamped on all new ALPHA bags — enables you to know, whether you make your own tests or not, that the cement will more than meet the United States Government standard and every other recognized test.



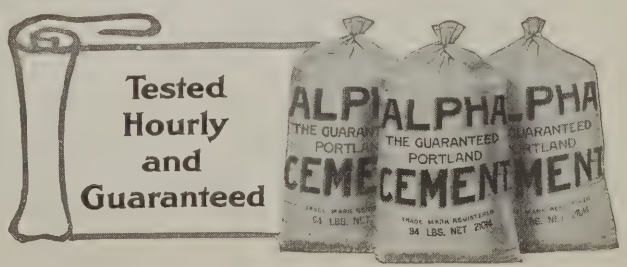




Free Plans If you are about to build a garage, barn, poultry house, greenhouse, small dam, dairy house, or porch floors or steps, ask the ALPHA dealer in your community to secure valuable free plans for you. The ALPHA dealer will also be glad to give you the 80-page book, "ALPHA Cement—How to Use It," which tells how to make all the improvements illustrated here, and dozens of others as well. If you do not know the ALPHA dealer, write us, mentioning what you are planning to make or build. Ask for Book No. 17.

ALPHA PORTLAND CEMENT CO., General Offices **EASTON, PA.**

Sales Offices: New York, Philadelphia, Boston, Pittsburgh, Baltimore, Savannah



A 1916 GARAGE

-YOU-

WHO ARE BUILDING OR REMODELING GARAGES THIS YEAR, WILL CERTAINLY WANT SEVICEABLE, ECONOMICAL AND ORNAMENTAL HARDWARE.

The Stanley Works manufactures a complete line of up-to-date garage hardware; from a garage door holder, which prevents your doors from slamming, to 36-inch hinges for brick and concrete garages.

Write today for free booklet "E" on Garage Hardware.

STANLEY S.W. WORKS
NEW BRITAIN CONN. U.S.A.

ALWAYS ACCESSIBLE

Saves $85 on Average Job



Here's a time-saving closet that'll enable you to bid lower—to get more of the jobs you figure on—and make more on each job.

Every man on *building, road construction, sewer* or *other jobs* wastes 10 minutes twice daily going to and from your inaccessible closet—that's 20 minutes daily, 8½ *hours monthly* (520 minutes). 20 men 2 months on a job lose 340 *hours*, and even at 25c. hour waste $85. The

Kaustine Portable Closet

is always so accessible that a man never wants to delay relief—such delays make men sluggish, deadening physical and mental effort.

Kaustine, the powerful, germ-killing disinfectant makes this system odorless and sanitary.

Promote your own profits. A copy of our new, intensely interesting catalog awaits you—what's your address?

Kaustine Co., Inc., DEPT. B 1, Buffalo, N. Y.

Also C. P. R. Bldg., Toronto, Ont.

fort. A rubber-covered pulley 14-in. diameter and 10-in. face drives the belt.

The Amherst Warm Air Furnace

The heating question is one of never-ending interest to the architect, the builder and the house owner, and they are therefore likely to find much to command their attention in a folder which has been sent out by the Buffalo Co-Operative Stove Company, Buffalo, N. Y., which illustrates and describes a new hot-air furnace known as the Amherst. In its construction the front is made entirely of cast iron in two sections, the fire and ash pit doors are large; the grate is of the triangular roller-bar pattern which is easy of operation and permits of the bars to be removed separately; the fire part section is in two parts while the combustion chamber below the radiator is made in one piece. Cup joints filled with asbestos cement are used, which it is claimed prevent leakage of air, gas and dust. The radiator is composed of heavy cast iron top and bottom rings with sides of heavy gage sheet steel. The dome is made in one piece of solid cast iron and the dust flue pipe connects the ash pit with the combustion chamber so that when shaking the grate the ash dust is drawn into the combustion chamber and then to the chimney, thus preventing its escape to the cellar. The furnace is made in three sizes and is fitted with water pan which, it is pointed out, will constantly supply the air in the house with all the moisture needed and keep it at the average summer humidity.

Mottled Asphalt Shingles

Architects and builders will be interested in learning that the Asphalt Ready Roofing Company, 9 Church Street, New York City, has just brought out a line of mottled asphalt shingles, which in view of the present tendency toward mottled roof effects, cannot fail to command widespread attention. These mottled shingles are surfaced with different quantities of red and green slate, some being half red and half green, some nearly red and others nearly green, and when the shingles are mixed together and properly laid they give to a roof tone and individuality. Although the shingles have been placed upon the market only a very short time, a number of architects have specified them and indications point to a rapidly growing popularity.

Cassens' Ideal Eaves Trough

Cassens' Ideal Eaves Trough is the subject of a little pamphlet which is being sent out by Cassens Mfg. Company, Edwardsville, Ill. It is of simple construction and is said to completely overcome the disadvantages of the old-style open gutter. Its construction is such that it cannot become clogged, neither will it fill with snow and ice. When it sleets the small opening—about ⅛-in.—is quickly closed and this prevents the bursting of the trough also of the downspout. When the ice melts the entrance opens automatically before the water from the roof reaches the gutter. The body is made in the usual semi-tubular form and the rear wall extends upward to which is attached a cover having an inclined upper face. The lower edge of the cover curves downward and terminates inside of the front wall of the trough, leaving a relatively narrow space for the entrance of the water. The claim is made that no matter how hard it rains the "Ideal" will catch all of the water. The cover can be had in 5-ft. sections and is detachable so that the gutter may be painted without removing it from the building.

The Archer "Special" Concrete Mixer

Archer Iron Works, 2440 West Thirty-fourth Place, Chicago, Ill., is sending out an attractive four-page folder printed in colors and illustrating and describing the No. 1 Archer "Special" concrete mixer. One of the striking features is the low-charging platform which is of the right height to permit the discharging hopper to catch under the front edge of the wheelbarrow tray.

(*Continued on page 98*)



How to Haul Lumber and Building Materials Efficiently—

Your biggest problem is how to equip so as to be able to handle a large volume of construction work.

This can be accomplished by doing your hauling with a Federal Motor Truck or

FEDERAL Motor Trucks

as the case may be.

A large volume of work can then be handled because of the large territory served and the prompt service of Federal Trucks.

FEDERAL Service sells additional Federals.

For instance:—The business building service of truck No. 3452 sold truck No. 3555, and then still another. Loading of miscellaneous building and mill products in a very novel way permitted this truck to handle an enormous volume of business.

Write us for reports of Federals in the service of builders and contractors.

Have us send you "Traffic News," an interesting magazine on transportation.

FEDERAL MOTOR TRUCK COMPANY **Detroit, Michigan**

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.



For full description of this and other

SARGENT WARRANTED PLANES

SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY

Makers of Squares, Planes and Mechanics' Tools

53 Water St. New Haven, Conn.

YOU—MR. BUILDER!

I'm trying to save YOU money—for years I've done it for others.

I have issued a catalog of Lumber, Mill-work, Mantels, Hardware, Roofing, etc. It offers YOU, I believe, remarkable values.

I want YOU to have it—a postal request will get it. **YOU need it!**

Why not send for it today **—now?**

H. A. HUBER, Pres't.

The Huber Builders Material Co.

48-50 Vine St., Cincinnati, O.

The man simply lifts the handles of the wheelbarrow and the charge is dumped directly into the drum. The Archer uses a half sack of cement per batch on a 1:3:6 mix or a whole sack on a 1:2:4 mix. This it is pointed out saves time, as there is no dividing a sack into small sections. The discharge spout is so arranged that the drum can be emptied in ten to fifteen seconds. The mixing is done by the bucket and blade method, the drum being equipped with six buckets and six blades —two blades being reversed—and the mixing concrete falls on the discharge spout, which when tilted back throws the material far into the drum to give a remixing action. The drum is provided with splash plates which it is claimed make it impossible for concrete to splash out. The mixer is readily portable and can be shifted around to any part of a job by reason of its narrow tread. One man can easily lift it at the platform end, as the wheels, engine and drum are so placed as to make a perfect balance.

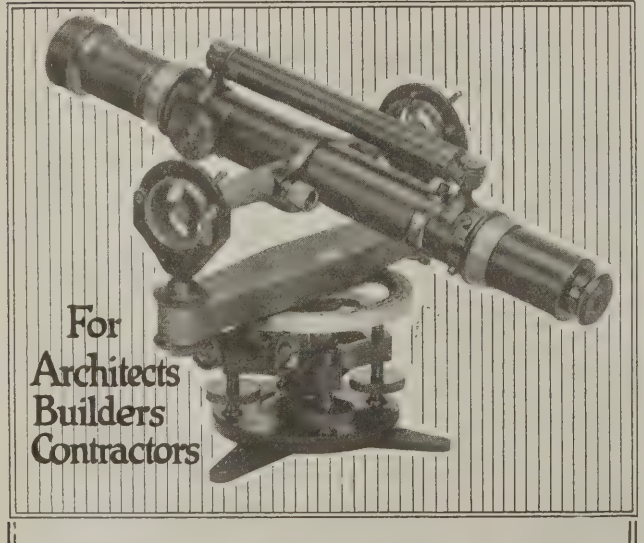
Something New in Hollow Steel Doors

Architects, builders and owners generally throughout the country will be interested in a new development in connection with building construction which has to do with the standardization of hollow steel doors. This has been brought about by the Solar Metal Products Company, Columbus, Ohio, which claims by this standardization to have largely reduced the cost for the reason that a builder can purchase standard doors at a fixed price instead of securing prospects on each particular door. The trouble in the past seems to have been that hollow steel has cost too much, and this excessive cost has been, in the average case, the stumbling block when architects desired to specify hollow steel. The problem which confronted the company was to supply hollow steel doors at a fair price, and this has made possible their use in all the better class of buildings, apartment houses, schools, etc. The remedy for excessive cost and a restricted field was to establish suitable standards of size and quality. The new deal means not only lower prices, but a better product, and to the architect it means less work and more knowledge; to the contractor quick and accurate estimating with delivery on time, and to the owner the possibility in moderate priced buildings of having handsome, durable, fire-resisting doors that will neither crack, shrink, swell nor stick. The company offers a comprehensive series of standard styles ready for assembling, finish and delivery. The cost of hollow steel doors turned out under these new conditions is said to be on the average just a little more than one-half of former prices. The details and specification of Solar standard doors are covered in a convenient loose-leaf handbook, a copy of which can be secured on application.

Rodgers Automatic Stair-Door

A development in connection with two-family houses and one which enables the same space to be used for baeement stairs for both of the two families in the building is the automatic stair-door to whic hthe attention of architects and builders is being drawn by William F. Rodgers, 3552 Pine Street, St. Louis,

(*Continued on page* 100)



Improved Convertible Level

A level that can be instantly converted into a transit. Our patented Axis makes this possible in half the time required by the old type instrument.

It is an accurate, durable instrument at a moderate price.

Write for circular—also catalog of drawing material.

New York Blue Print Paper Co.

58-60 Reade Street, New York



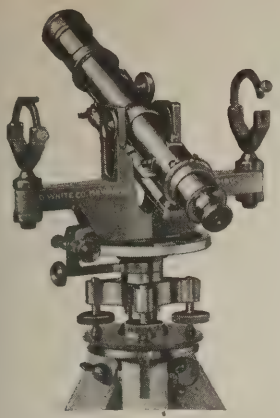
Decorative Concrete

Better Looking, Better Selling Products With Your Present Equipment

We have no machinery or materials to sell—simply the process and formulas for making high grade decorative concrete. Exact reproductions of Marble, Granite, Onyx, etc., at ¼ the cost of actual marble. Block Facings, Porch Work, Composition Flooring, Interior and Exterior Trim, Mantles, etc.

You can make Art Marble Wainscoating, Tiling and Composition Floors for a Hall, Vestibule, Bath or Fire Place almost as cheap as hard wood.

ART STONE CO. Box 500 **Waynesboro, Pa.**



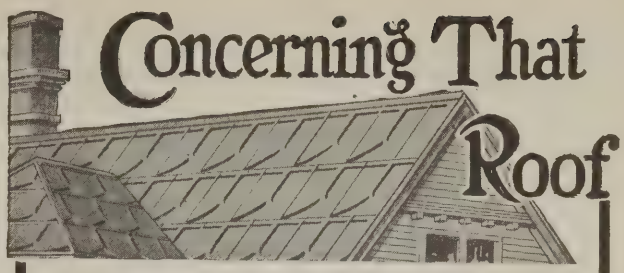
No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.)
421 E. Water St., Milwaukee, Wis.

Concerning That Roof



A Quick, Easy Job With CORTRIGHT METAL SHINGLES

CORTRIGHT Metal Shingles are so easy to put on, and such explicit directions are given, that no special skilled labor is required. Your bid on contract work can fairly reflect this freedom from future trouble, and be accordingly low. The extensive field for use of such a moderate priced permanent roofing, together with the convenience of handling, are the two features that have made CORTRIGHT such an advantageous proposition for contractors to push. Write us for any special information you wish. Our service is yours for the asking.

Cortright Metal Roofing Co., Philadelphia and Chicago

Carpenters Double Your Income!

Start today towards a bigger income, don't continue to slave along on a small salary. Many carpenters, just like yourself, are increasing their earnings 100% every day. They are *moving houses* instead of *wrecking* them. Give yourself the same chance with a set of

All Steel Giant Trucks

and our complete equipment. There is *plenty of work*—the house-moving contracting business is *growing rapidly* every day. To prove this we offer the outfit *FREE* for 30 days. Get it and see for yourself the amount of work in your locality for the man who is prepared. Experience not necessary. We help you and make you ready. Write today for special *Free Trial* and complete information. Ask for catalog "E."



LA PLANT-CHOATE MFG. CO.
625 Eastlack Ct., Cedar Rapids, Ia.

Members of the Iowa House Movers Association.

THE BEST LUMBER

FOR THE OWNER OR THE INVESTOR TO PAY FOR IS

THE BEST LUMBER

FOR THE CARPENTER AND BUILDER TO USE.

Don't Forget That Good Reputations are Built on Good Recommendations. USE AND RECOMMEND

CYPRESS

(OF COURSE)
BECAUSE IT'S "THE WOOD ETERNAL"
& LASTS & LASTS & LASTS & LASTS & LASTS

Write

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1227 Hibernia Bank Bldg., New Orleans, La., or 1227 Heard Nat'l Bank Bldg., Jacksonville, Fla.
For Vol. 1, Cypress Pocket Library. (Full Reprint of U. S. Gov. Rept.)

HESS MEDICINE SANITARY CABINET LOCKER



The Recessed Steel Medicine Cabinet

The Only Modern, Sanitary STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



The Outside Steel Cabinet

Send for Illustrated Circular

HESS, 1201-L Tacoma Building, CHICAGO
Makers of Steel Furnaces. Free Booklet

In every summer cottage you build



Absolutely Odorless Sold on a Real Guarantee

—you can install, *at a profit*, a

Ro-San Indoor Closet

Every building—home, cottage, store or office—that has no sewer connection needs this modern sanitary indoor closet. Absolutely odorless. Act as our agent—this fixture sells easily to your customers—good profit. Hundreds of carpenters represent us. We also distribute through builders the

Ro-San Washstand

Provides Running Water, Hot or Cold, Without Plumbing. Every housewife wants one. Convenient, sanitary. Sells readily with little effort. Carry this work along with your regular business. Ask for terms to agents.

ROWE SANITARY MFG. CO.,
485 Rowe Bldg. Detroit, Mich.

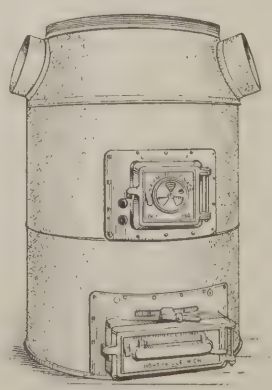


The "Harmon" with Its Jacket On

The Harmon has an all-cast iron body and a galvanized iron casing, which renders it dustproof and prevents gas leakage.

Equipped with double shaker *ball bearing* grate having a conveniently operated hand shaker.

Get full details from headquarters.



American Bell & Foundry Co.
Northville Michigan

CONCRETE FOR PERMANENCE

New Business for You

Develop new business in your locality—build stucco and concrete garages, for instance: Automobile owners are quick to see the advantages of permanent, fireproof, sightly garages.

Make an effort to get orders for greenhouses, porches, pergolas, pavilions, dairies. The business you develop is yours and pays the best profits. Here is how we help you.



Atlas-White Stucco Garage

Atlas Cooperation

We will furnish you—without charge—suggestions to help you develop new business, and information and specifications for good stucco construction. We will also send you our helpful Contractor's Atlas free each month. Write for information.

The Atlas Portland Cement Company

30 Broad Street, New York Corn Exchange Bank Bldg., Chicago

Philadelphia Boston St. Louis Minneapolis Des Moines Dayton

PORTLAND ATLAS CEMENT

"The Standard by which all other makes are measured"

Mo. The door consists of the five steps at the foot of the flight of stairs from the second story, and is directly over the stairs leading to the basement. The arrangement is such that the pressure of the foot against a catch plate opens the door, which can be operated either from above or below, and when the door is open one may pass up or down to the basement stairs without trouble. The stair-door is referred to as a great saver of space and can readily be installed in old or in new houses. The arrangement is such that the door in the stairs is practically invisible, the only indication of it being the very small crack which appears on either side just within the stringers.

New Upson Wall Board

The latest addition to the imposing list of improvements which the company has introduced in the wall board industry during the last five years is the new 64-in. wide board which has just been placed on the market by the Upson Company, 92 Upson Point, Lockport, N. Y. This wide panel opens up many new avenues of use which cannot fail to be appreciated by the carpenter and builder. By means of this 64-in. board, paneling is greatly minimized, giving as it does a practically unbroken wall surface. Only two 64-inch panels of Upson processed board are needed to cover an ordinary wall area, and where no openings occur between the usual openings one panel will be sufficient. Interested readers can obtain samples for their own test simply by writing to the company.

Important Purchase of Metal Lath Interests

Just as we go to press we learn that the Sykes Metal Lath & Roofing Co., Warren, Ohio, has purchased the metal lath department of the Brier Hill Steel Co., at Youngstown, formerly operated under the name of the Garry Iron & Steel Co., at Niles, Ohio, making the Sykes Metal Lath & Roofing Co. one of the largest producers of metal lath in the country. The company will continue to operate the plant of the Garry works at Niles, in addition to its own plant at Warren.

TRADE NOTES

American Sheet & Tin Plate Company, Frick Building, Pittsburgh, Pa., has just been distributing an interesting booklet entitled, "Research on the Corrosion Resistance of Copper Steel," by D. M. Buck, Metallurgical Engineer of the company, and J. O. Handy, Director of Laboratories of the Pittsburgh Testing Laboratories. The matter has been presented in attractive shape and will be found of interest to many connected with the building industry.

The illuminated calendar which the Richards-Wilcox Mfg. Company, Aurora, Ill., sends out for March carries a panel picture of a most charming young lady entitled "Sunshine," which evidently signifies her temperament. On the back of the card is the application of the word "sunshine" to the company's business, the point being made that "as the warm rays of the sunshine bring out the luster and build up life, so do right business tactics build up trade friendship and spread wide the prestige gained by a square deal to all." The card calendar accompanies the March issue of DooR-Ways, the house organ of the company. This has, among other things, an interesting article on hanging garage doors.

Tubular Heating & Ventilating Company, 223 Cherry Street, Philadelphia, Pa., has just issued from the press an attractive catalog of forty-eight pages illustrating and describing the Forbes warm-air furnace. This heater is only 4 ft. 3 in. in height, thus readily adapting it for use in low cellars and at the same time allowing of proper pitch to the distributing pipes in order to insure the best results. Special attention is drawn to

(*Continued on page* 102)

YOUR HOUSE WILL LOOK

much more attractive if you use



KEES Metal Building Corners

These little galvanized iron pieces, used with lap siding, fit perfectly, give a mitre-corner effect and save time and expense of beveling. Cost little—last always.

Write us for free samples and particulars.

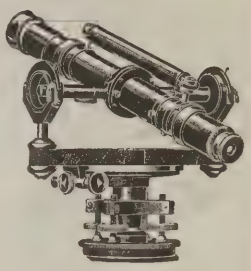
F. D. KEES MFG. CO. BEATRICE, NEB. Box 812

Let us tell you about Gossett Window Screen Hangers. Free samples.

Kolesch "Builders" Tilting Level No. 7850

Designed particularly for the leveling and plumbing of walls, giving lines and levels for buildings, laying out angles, grading streets, sewers, drains, etc.

Sturdily built for durability, yet sensitively accurate. Sold complete in a polished box with plumb bob, adjusting pins, metal trivet, book of instructions, and tripod for $57.50.



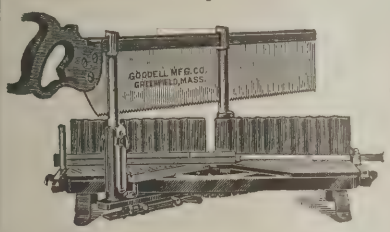
KOLESCH & CO.

138 Fulton Street New York, N. Y.

No Cast Iron Here

This Mitre Box is **All Steel.** Not an ounce of cast iron in it. What's its name? Why, the **Goodell,** of course.

Steel Truss Frame or Bed, Cold Rolled Steel Corrugated Back, Wrought Steel Lever or Saw Support. Automatic Detents for Holding up Saw. Steel Bottom Plates with Angular Serratures. Long Saw Guides and Many Other Features.



Write for new Circular K B 51 describing the box that cannot break.

GOODELL-PRATT COMPANY

Toolsmiths

Greenfield, Mass.

RODGERS AUTOMATIC STAIR-DOOR

The Big Space Saver FOR FLATS OR TWO-FAMILY HOUSES



Permits inside entrance to basement but saves basement stair space.

Gives more space for first floor rooms.

Can be installed in old houses where only entrance from second floor to basement is from outside.

Any builder can easily install. Send for plans and full information.

Wm. F. Rodgers

3552 Pine St., St. Louis, Mo.

LUMBER Prices soaring!

H-L-F Price Still Low

Rush your bills

Every day the lumber market gets a little higher.

We still are filling orders at a very low price. Soon as our big winter stocks are moved, price must advance.

You'll probably never again have the chance to buy lumber as cheap as now. Rush your material bills.



Hewitt-Lea-Funck Co. Capital $1,000,000 Not in any trust or combine.

559 Funck St., Sumner, Wash.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

C. E. JENNINGS STEERS PATENT EXPANSIVE BIT



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. *Sole Mfrs.* 71-73 Murray St., N. Y.

FINISH THE JOB RIGHT

Use The "Ideal Gutter"

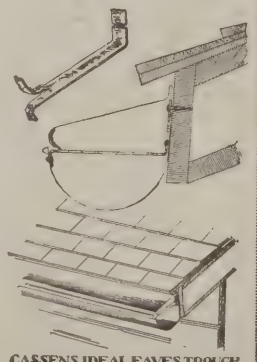
Cassen's Ideal Eaves Trough overcomes the disadvantages of the old-style open gutter. It insures clean, healthful cistern water. It is never clogged.

Have you seen it? If not we want you to try it. If "The Trough with the Lid" doesn't beat anything you have ever seen in the gutter line, tell us and you get your money back.

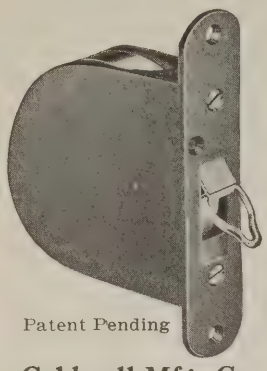
Write us for full particulars.

CASSENS MFG. CO.

Edwardsville, Ill.



CALDWELL SASH BALANCES UNIFORM MORTISES



Patent Pending

For use in all classes of new work

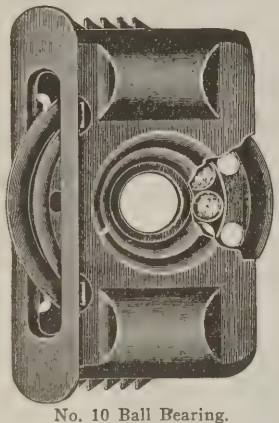
Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for circular

Caldwell Mfg. Co., 5 Jones St., Rochester, N. Y.



No. 10 Ball Bearing.

"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

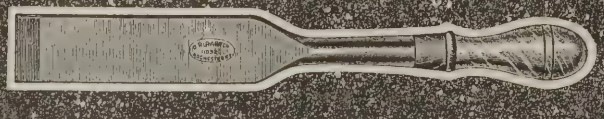
PAYS ITS COST ON ONE JOB



Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 3d galvanized No. 13 gauge 1¼ inch wire nails.
List price $7.00 (*but an order from this ad will bring you either size by prepaid parcel post for only Five Dollars*).

Pearson Mfg. Co.
Robbinsdale, Minnesota
Makers of Hand Nailing and Tacking Tools

MACK & CO.



YOU will always feel secure when you use Barton Planes and Edge Tools. The making of keen edged tools that hold their sharpness is our hobby. If your dealer won't supply you we will.
There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

Brown's Race & Platt St., Rochester, N.Y.

the radiating manifold, "a new principle in connection with heating air." The radiator is made of cast iron without joints, and is thus gas-tight. In addition to the many illustrations are several pages of testimonials from some of the many who have made use of this heater with gratifying results.

"The Shingle of the Century" is the suggestive title of an attractively illustrated folder being sent out by Bird & Son, Dept. B, East Walpole, Mass., and relating to the merits of Neponset shingles. After years of preparation the maker announces a "tremendous spring campaign on Neponset shingles," and the statement is made that last year the campaign, with the help of Neponset dealers, brought the biggest business of the makers' 120 years' existence.

The Bridgeport Wood Finishing Company, New Milford, Conn., is directing the attention of architects and owners to some new types of finishes which are playing an important part in attractive interior decoration. These include Bridgeport standard gray acid stains and WonderLac. The company makes announcement that it is ready to furnish sample panels to those who may write for them. Architectural service departments are maintained in New York, Boston, Chicago and Philadelphia.

Bird & Son, Department B, East Walpole, Mass., is distributing a folder printed in colors relating to Neponset and Proslate shingles. Emphasis is laid upon the statement that the big profits go to the Neponset dealer purchasing the makers' roofings, building papers and wall boards in mixed carload quantities. A free booklet sent out by the makers entitled, "Repairing and Building," contains the story of the various specialties of the concern.

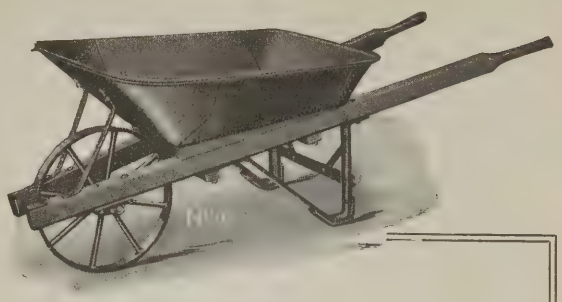
Art Stone Company, makers of high-class concrete specialties, Waynesboro, Pa., is directing attention to the artistic effects in connection with various classes of concrete work which may be produced by the processes which it controls and licenses for the use of which are issued at stated rates. By these processes the builder or contractor may imitate marble, granite, sandstone, onyx and other natural stones and at a comparatively small cost. The company states that it has no machinery or materials to sell, but that the processes for which it grants a shop license enable the builder and contractor to greatly increase his business by improving, without appreciable cost, the products which can be turned out by his own equipment. In connection with the offer which the company makes it will mail the builder or contractor a dozen or more varied samples, and at the same time it offers its patrons, free of charge, expert service on any specialties in which they are interested or intend to take up for consideration.

Wadsworth, Howland & Co., Inc., Boston, Mass., has been favoring its friends in the trade with an advertising novelty in the shape of a *facsimile* of its Bay State trademark. This is made in two parts, each of the exact outline of the trademark, which, by the way, is a representation of a member of the original Plymouth Colony, and carries between what may be described as the front and back covers small pieces of court plaster for emergency use.

"Medusa Waterproofing" is the title of an exceedingly attractive booklet just off the press and sent out by the Sandusky Portland Cement Company, Engineers Building, Cleveland, Ohio. The advantages of Medusa waterproofing are set forth at considerable length and in a way to prove of special interest to the architect, the builder and the owner. Directions are given for using Medusa waterproofing powder in connection with concrete blocks, in mortar, plaster and stucco and as a wash. The illustrations are halftone engravings of buildings in connection with which Medusa has been used and there are numerous testimonial letters from some of the many who have practically demonstrated the merits of this waterproofing material. We understand that any reader of The Building Age can secure a copy of this booklet by writing to the address given.

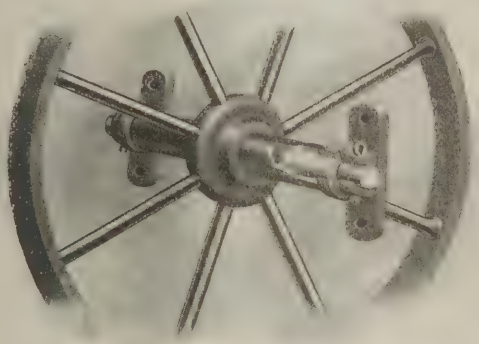
(*Continued on page* 104)

Sterling Wheelbarrows Are Different



—and Better, because Different.

Oil-impregnated fiber Bushings for Wheel Bearings make its wheel self-lubricating. No squeaking. No oiling-nuisance. The older the barrow the more glassy-smooth the bearing. This is one difference.



Then note the patented Braces that tie the handles to the legs. No holes bored through handles. Another important Difference.

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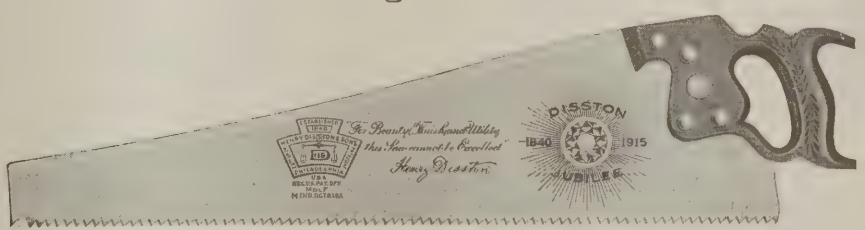
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Dutch Boy White Lead

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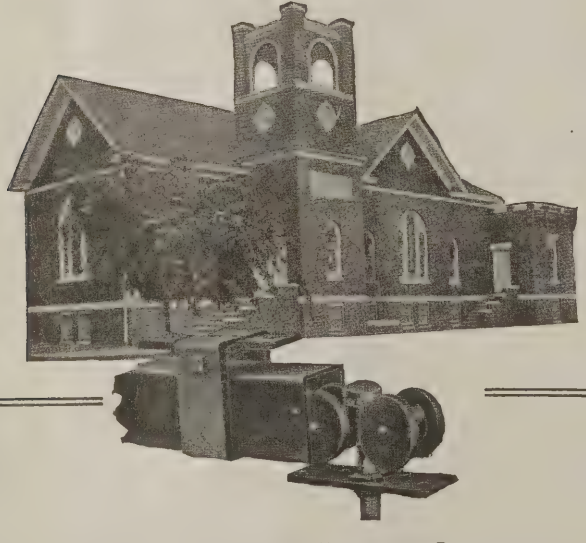
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Send for New No. 12 Catalog.

Walter H. Kestin, sales manager of the concrete machinery department of the Northwestern Steel & Iron Works, Eau Claire, Wis., represented his company at the tenth annual Middle West Cement Show, held under the auspices of the Middle West Cement Users Association at Omaha, Neb., Feb. 29 to March 4. An exhibit was made of the well-known "Northwestern" line of concrete mixers and concrete tile forms. The 5-ft. mixer in particular attracted an unusual amount of attention and we understand a large number of sales were made.

Harry Louis Meacham has recently opened an office for the practice of architecture at 39 Circuit Avenue, Worcester, Mass., and is desirous of obtaining catalogs and samples from manufacturers of building materials.

A recent addition to the office force of the Willis Mfg. Company, Galesburg, Ill., is H. L. Swan, who for several years was secretary of the Rockford Mitre Box Company, Rockford, Ill.

Oak Flooring Service Bureau, Conway Building, Chicago, Ill., is distributing a unique calendar for 1916 consisting of a piece of celluloid 3½ in. high by 3¾ in. long and colored to represent a piece of oak flooring. On one side is the calendar proper and on the other is a brief statement of the use of the different grades of oak flooring.

Charles F. Lorenzen & Co., Chicago, Ill., is distributing an attractive folder printed in colors and calling attention to some of the many specialties which they are prepared to furnish. Special attention is called to mosaic tile for bath room floors, also to tile fireplaces, ceramic mosaic floor tile as well as to red quarry and promenade tile. Not the least interesting feature are several patterns for mosaic floor tiling.

H. F. Wardwell, former home office manager, was appointed general sales manager of the Fenestra Division of the Detroit Steel Products Company, Detroit, Mich., the change taking effect Feb. 1. He succeeded P. A. Smith, who recently resigned to engage in another line of business.

A new plant known as Mill No. 7 of the Universal Portland Cement Company, has been established at Duluth and will have a daily capacity of 4000 bbls.

Sterling Wheelbarrow Company, 6201 Shenners Avenue, West Allis, Wis., is directing the attention of building contractors to its line of Sterling wheelbarrows which in their construction embody many interesting features. Use is made of patented braces that tie the handles to the legs so that no holes are bored through the handles. Then there are the reinforced channel steel legs, the method of joining wheel axle to the malleable side brackets without the use of nuts, and oil-impregnated fiber bushings for the wheel bearings making the wheel self-lubricating. The claim is made that the older the barrow the more glassy-smooth becomes the bearing. The company has issued Catalog No. 19, which sets forth the merits of these wheelbarrows at considerable length, and a copy of it can be secured on application.

The February issue of *Traffic News* which is published by the Federal Motor Truck Company, Detroit, Mich., in the interest of economical transportation, contains a most interesting assortment of matter relating to the topic mentioned. The building-contractor appreciates the economy of transporting his materials and the extent to which the motor truck is used at the present day by building-contractors, lumber dealers, and others engaged in the building business is strong testimony in favor of such utilization. The motor truck has many advantages, both in summer and winter months, over the horse-and-wagon method, and this is constantly being manifested by the decreased use of the animal for these purposes.



The Building Age

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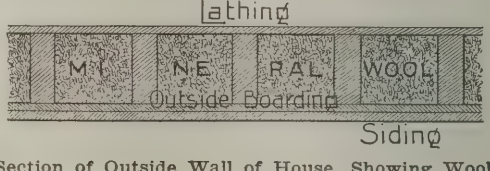
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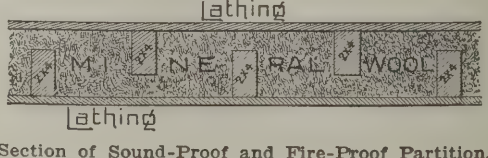
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The Building Age

NEW YORK, MAY, 1916

A Bungalow of Picturesque Design

An Exterior of Cypress with Roof of Cedar Shingles—"Outofsite" Beds a Feature

A DESIGN embodying a number of interesting features both from the standpoint of the architect and of the builder is the bungalow which forms the basis of the present article. The building is picturesque in its conception and treatment, while the interior arrangement is such as to invite careful study on the part of the home builder.

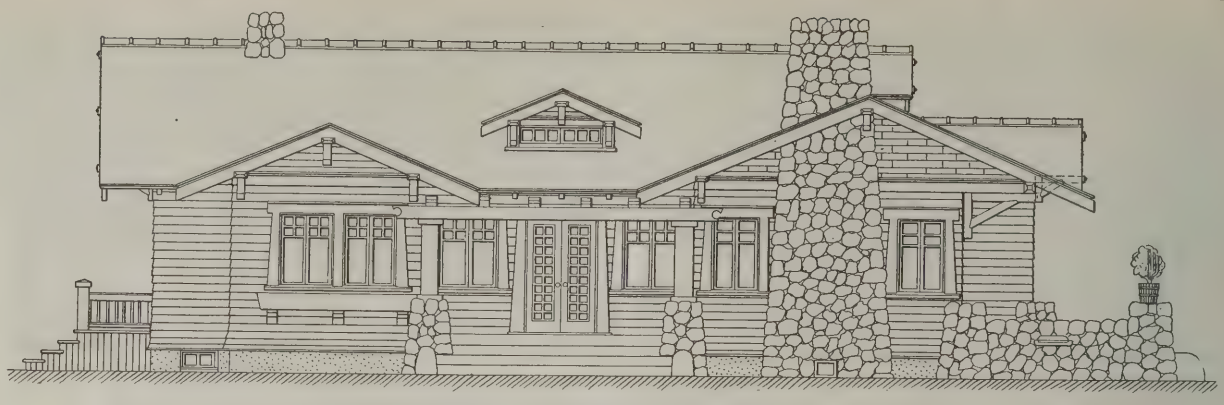
A commodious living room occupies a goodly portion of the front of the house, it being entered directly from the veranda which extends as far as the offset made by the den in the extreme right-hand corner. Beyond the living room is the dining room with a pergola entrance and beyond it is a breakfast room which communicates with the kitchen at the right. The dining room also communicates with the kitchen through a double swing door. The kitchen is equipped with range, cupboards, a sink which is placed under the triple window at the rear, where it has ample outside light and space for the refrigerator which is convenient to the porch entrance so that in icing it there is no necessity of passing into the kitchen proper.

The right-hand portion of the bungalow and immediately in the rear of the den has two sleeping rooms and bath room. The former are provided with commodious clothes closets, while a linen closet is conveniently placed to all of the rooms.

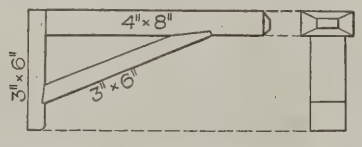


The Exposed Stone Work Is Such as to Give a Rugged Appearance to This Cozy-Cottage Type of Dwelling Which Has Been Designed by Morgan Rundel, of Detroit, Mich.

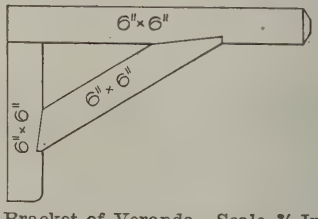
A feature of the exterior treatment is the stonework which is laid up as rough as possible, the masons having had instructions to use as little mortar as consistent with good work and not to get any on the exposed portions of the stone. They were also instructed not to chip or break any exterior stones, the idea being to have the latter present the appearance of stones laid one upon another and all the mortar possible raked out so as to leave the surface rough. Cement mortar of natural color was used and the result was a piece of work which, when completed, was pleasing to the eye and harmonized with the rest of the building.



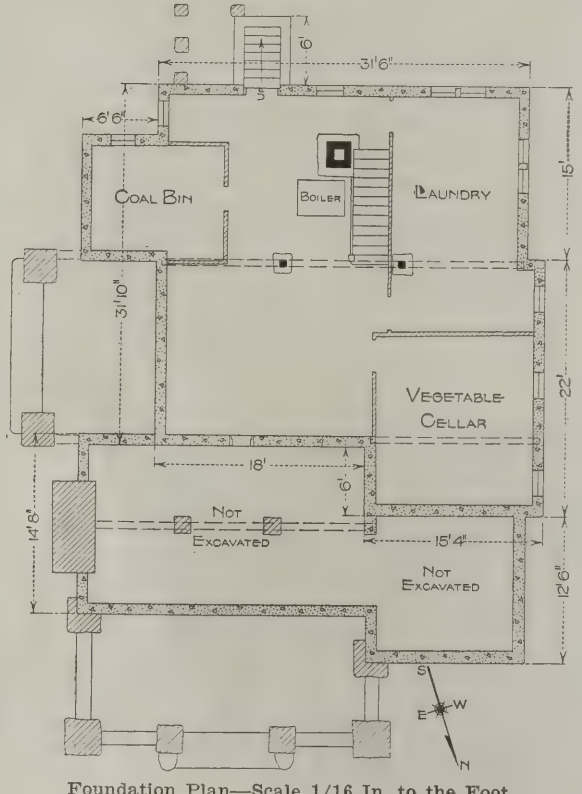
Left Side Elevation of Building Showing Rustic Chimney Construction—Scale 3/32 In. to the Foot



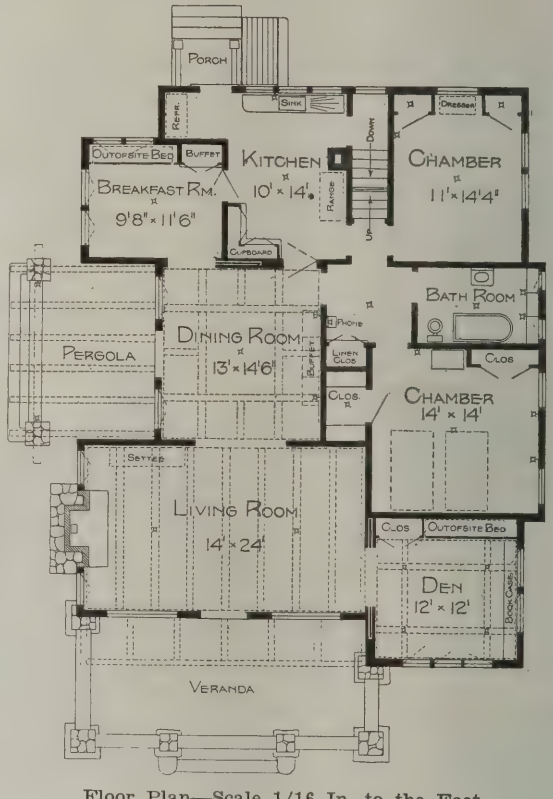
Detail of Bracket—Scale ¾ In. to the Foot



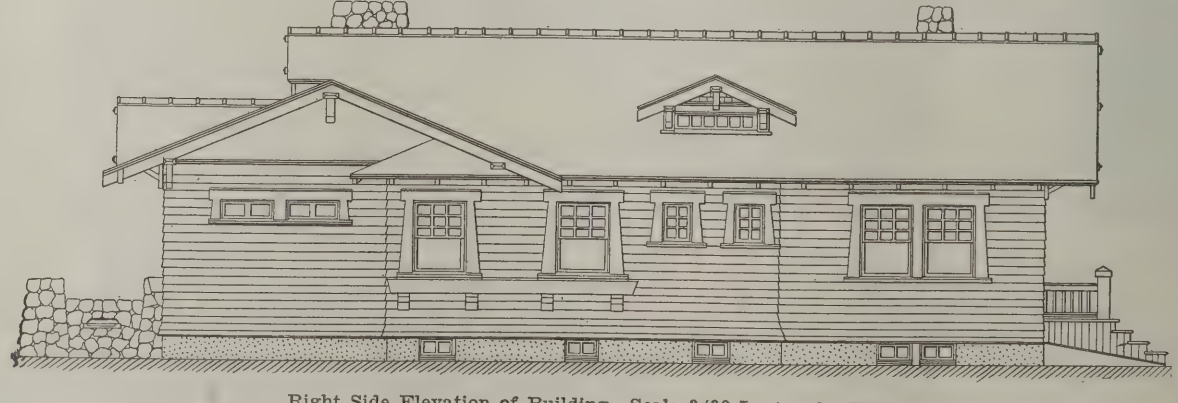
Main Bracket of Veranda—Scale ¾ In. to the Foot



Foundation Plan—Scale 1/16 In. to the Foot



Floor Plan—Scale 1/16 In. to the Foot



Right Side Elevation of Building—Scale 3/32 In. to the Foot

A Bungalow of Picturesque Design—Plans, Elevations and Various Details of Construction

The brick foundation walls are 8 in. thick and the inside portion of the walls is white lime brick. It was thoroughly covered on the outside with cement plaster ½-in. thick and then given a heavy coat of waterproofing so that the cellar is perfectly dry. A 3-in. tile is used inside and out.

The exterior is almost wholly of cypress. The walls are sheathed with ⅞-in. lumber over which is placed a good grade of building paper, and this in turn covered with 6-in. cypress siding with the rough side out and stained two coats nut brown. All exterior lumber used on the building with the exception of the window and door frames is rough, thus contributing materially to the picturesque effect of the design.

The bungalow here shown embodies a number of very interesting features in connection with its interior equipment and finish. In the breakfast room is a built-in buffet and there is a large buffet in the dining room. In the den is an "outofsite" bed which permits of the den being used for a sleeping room if required, and there is another "outofsite" bed in the breakfast room. Details of these beds are presented on another page. Over the bed in the den are bookcases and there are other bookcases along the right-hand wall under the double window. The doors throughout are of the single panel variety.

The bungalow here shown is located in the aristocratic Bloomfield Highlands, near Pontiac, Mich.,



A Bungalow of Picturesque Design—View in the Dining Room Looking Toward Buffet at the Right and Double Swing Door to the Kitchen Beyond

The roof is covered with clear 5 to 2-in. Washington red cedar shingles and stained the color desired. In the present instance the butts were dipped before putting on and then given a final coat when they were on the roof. The siding was also treated in the same way.

The studs are 2 x 4 in., the joists 2 x 10 in., the rafters and lookouts 2 x 6 in., and the ceiling joist 2 x 6 and 2 x 8 in.

The floors are double, the sub-floor being of ⅞-in. hemlock and the finish floors of Southern pine with deadening felt between.

The interior woodwork of the house is yellow pine stained to give the effect of fumed oak.

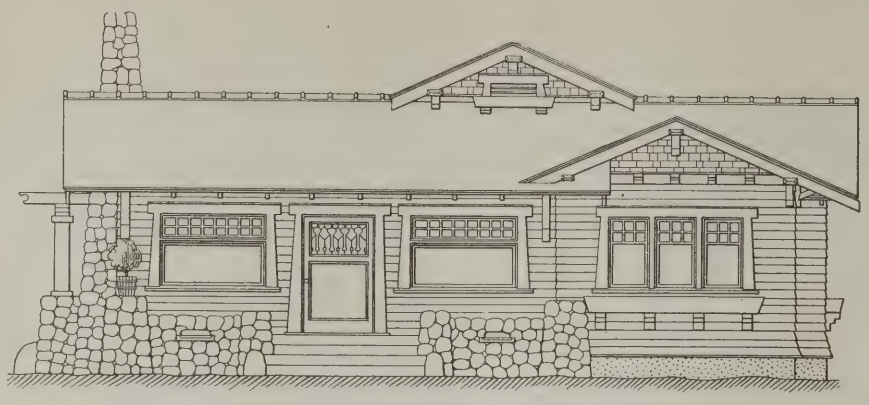
The rooms and the ceilings are covered with two coats hard wall plaster.

and was built for E. P. Waldron of Detroit. It is equipped with pressure water system, electric lights, gas machine and steam heating plant, the cost complete being in the neighborhood of $7,500.

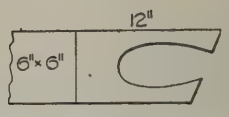
The work was done on the percentage basis and the design was by Morgan Rundel, 982 Woodward Avenue, Detroit, Mich.

Some Comments on Woods and Stains

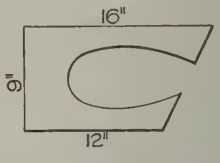
It is often required to imitate by means of the ordinary water stains the effect of fumed woodwork and where the so-called fumed stains cannot be used the ordinary coal-tar dye stain can be utilized provided the wood is treated before staining with a



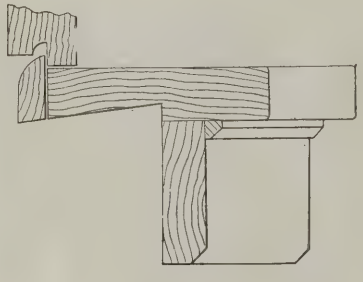
Front Elevation—Scale 3/32 In. to the Foot



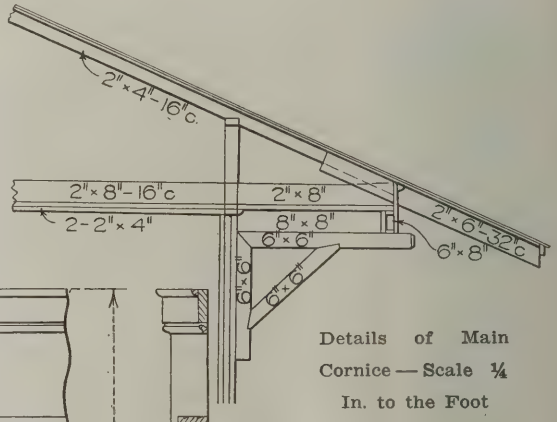
Beam End of Pergola



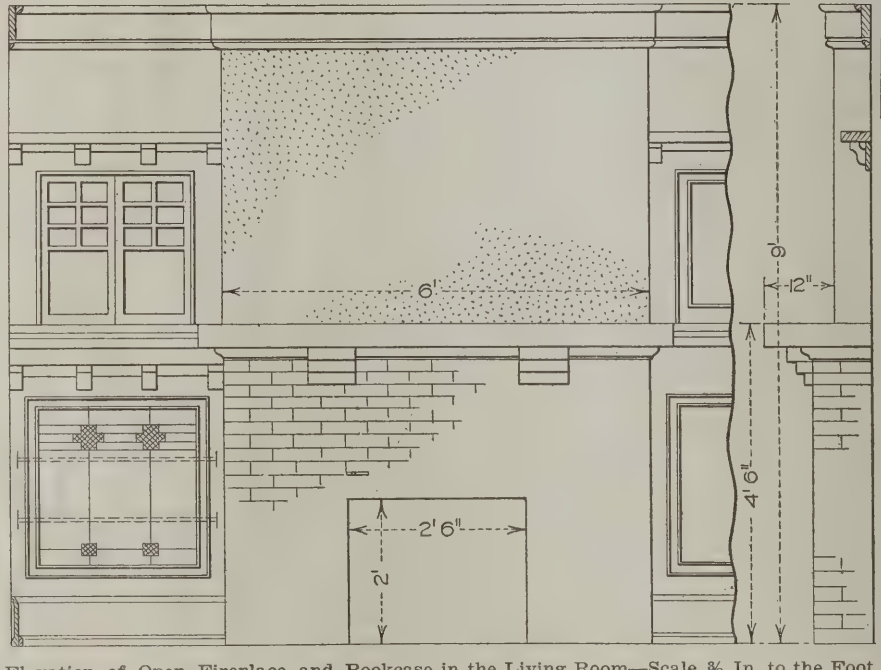
Beam End of Front Gable—Scale ¾ In. to the Foot



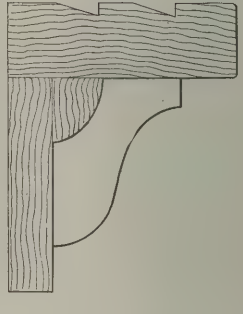
At the Left—Detail of Window and Door Trim—Scale 3 In. to the Foot



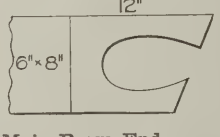
Details of Main Cornice—Scale ¼ In. to the Foot



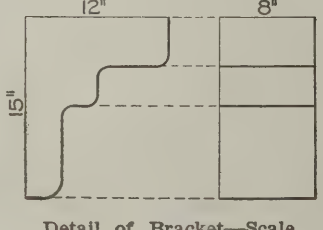
Elevation of Open Fireplace and Bookcase in the Living Room—Scale ⅜ In. to the Foot



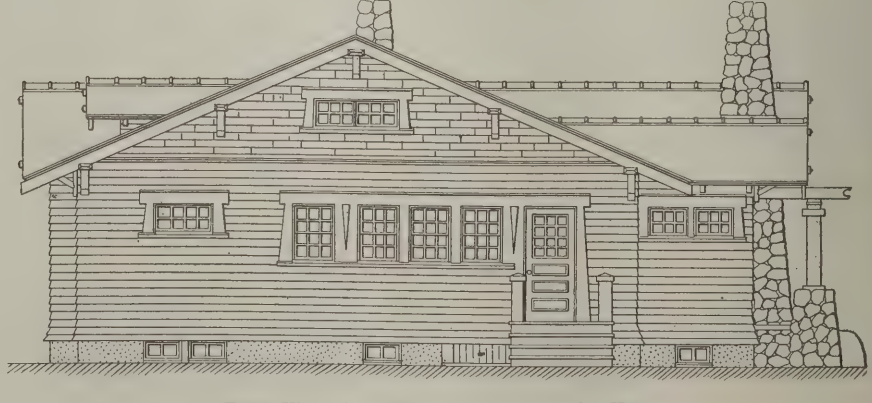
Detail of Bracket—Scale 3 In. to the Foot



Main Beam End



Detail of Bracket—Scale ¾ In. to the Foot



Rear Elevation—Scale 3/32 In. to the Foot

A Bungalow of Picturesque Design—Elevations and Miscellaneous Constructive Details

solution of 12 gr. to 16 gr. of soda to two pints of water and is sandpapered after drying. In all wood stains the nature of the wood itself is of course of prime importance. Maple can be stained gray without any trouble, while oak will not give the proper gray color in most cases since its color tends too much toward yellow and the gray stain—after waxing, shading and matting—shows greenish.

When light gray stains are used on oak it is often noticed that they turn yellow, especially if the stain is not light-proof and if it consists in the main of coal-tar dyes. All woods stained gray with iron salts take on a brown color in time. Most stains are made with such additions as potassium chromate, copper sulphate, etc., as also many metallic salts.

Most coal-tar dyes are either mixed at the shop, or, which is better, bought ready mixed, says a late issue of the *Journal* of the Incorporated Clerks of Works Association, London, England. With the greater number of shades and stains now on the market making up in the workshop is unnecessary.

If the stains are mixed at the shop, care must be taken in the first place to get lightproof colors, and that these colors are as nearly alike as possible in their resistance to the influence of light. For example, if a brown stain is mixed from black, yellow and red, then the stained wood will gradually take on a much lighter shade than desirable if the red was less lightproof than the other colors.

The same thing can be observed with the products of many paint-supply houses, for their paints and stains are also mixed from the fundamental colors. Brown colors consist, as a rule, of red, yellow and black dyes; gray colors of blue-black, yellow, a little red, and sometimes a little green. It depends on the preponderance of some color in the dye whether the final stain will have one shade or another.

If in a brown color red is in excess then the final shade will be reddish-brown. The modern greenish-brown shades similar to the fumed finish are usually mixed with green. Green deadens all colors. If too much is used, the shade will have too great a greenish hue, and red may be used to offset the green.

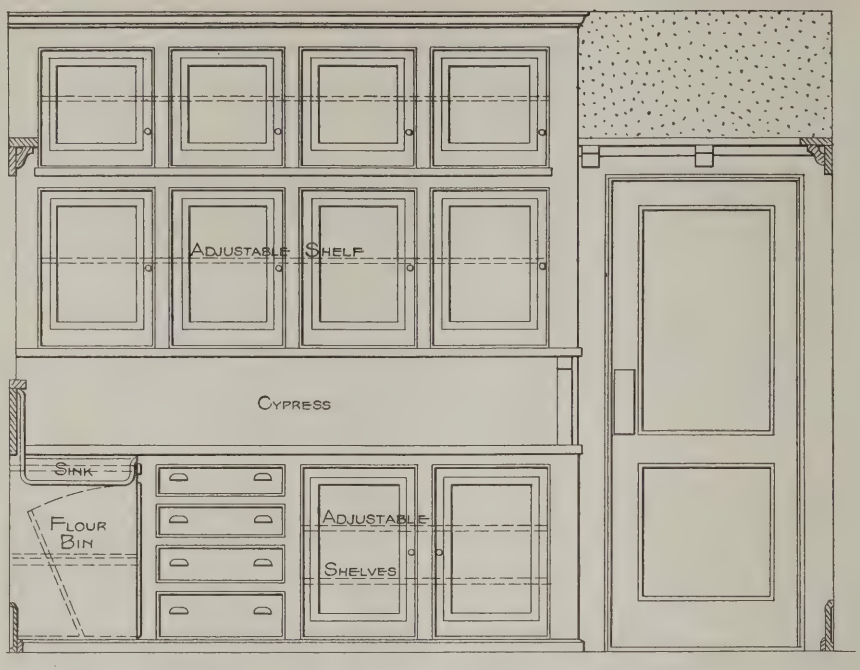
Coal-tar dyes may be deepened in shade by adding a little potassium chromate or a little sodium hydroxide. Most colors may be made by using the fundamentals red, yellow and blue. Since the blue colors are, however, less lightproof than the others, they are avoided wherever possible, and other colors are substituted.



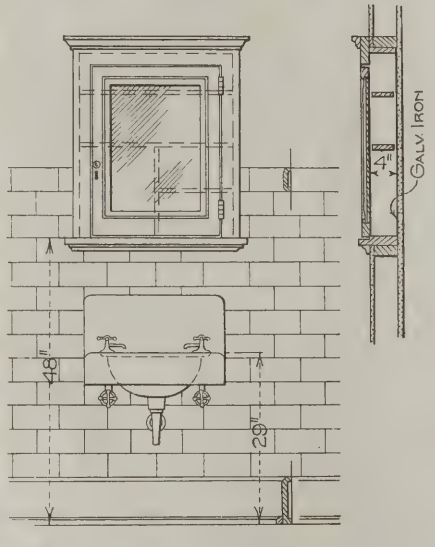
A Bungalow of Picturesque Design—View in Living Room Looking Toward Open Fireplace with a Glimpse of the Dining Room at the Right

It is impossible to get exactly the same color on a wood with the same stain. A piece of woodwork will show considerable differences in shades in the various parts, a state which is not very obvious in the completed product. If the different parts were laid side by side, however, the enormous differences in stain would be at once apparent.

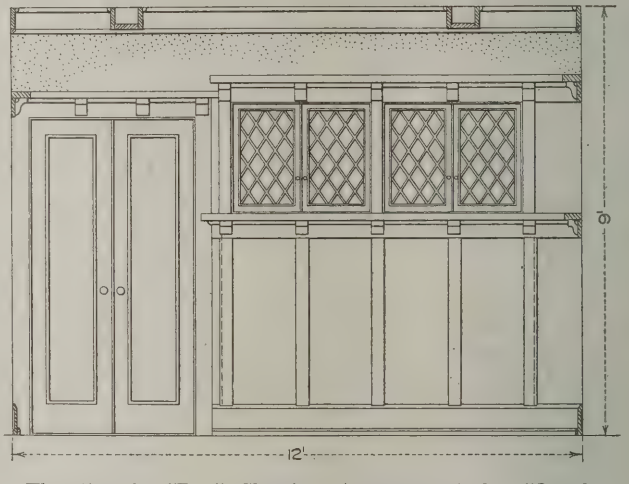
The reason lies, of course, in the natural difference of the wood itself. Oak, for example, shows such a difference even when taken from the same trunk that it is impossible to get a uniform shade over the entire surface. A good stain is not sup-



A Modified Arrangement for the Kitchen Equipment with Double Swing Door—Scale ⅜ In. to the Foot



Elevation and Section of Medicine Cabinet—Scale ⅜ In. to the Foot



Elevation in "Den" Showing Arrangement for "Outofsite" Bed—Scale ¼ In. to the Foot

Typical Kitchen Arrangement Looking Toward the Sink Under the Triple Window at the Rear of the House —Scale ⅜ In. to the Foot



Miscellaneous Constructive Details of a Bungalow of Picturesque Design

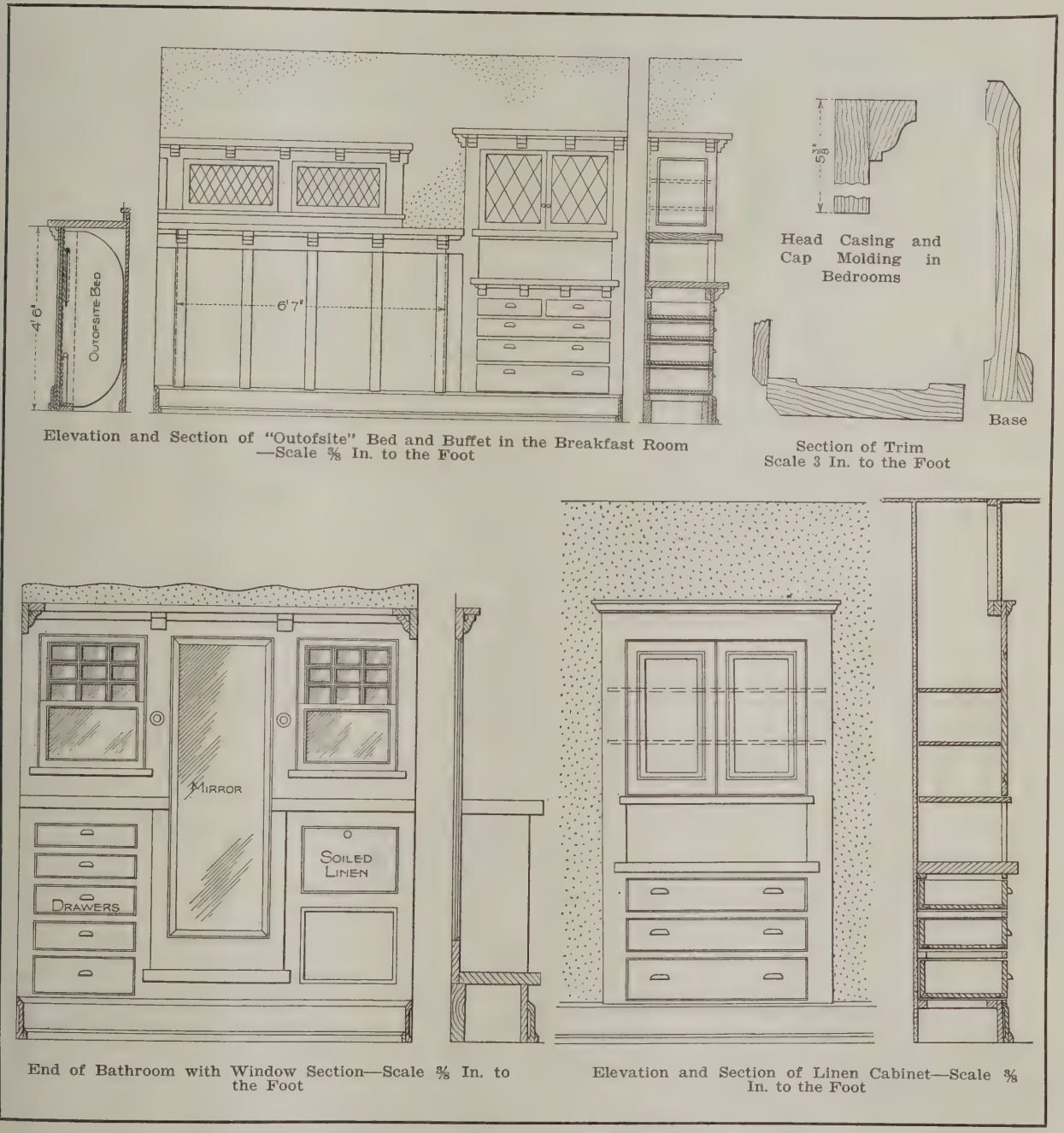
posed to cover the natural grain of the wood, but is presumed to show it up more clearly. The stain should stain the wood uniformly over the entire surface, but it cannot be expected to produce an absolutely uniform effect.

Often woodworker and stain manufacturer have long arguments and differences about the nature and quality of the stain, merely because the woodworker demands something of the stain which he has no right to demand. This is especially true if he is required to stain two pieces of woodwork alike. He may not allow for the difference in grain and structure, and then lays the blame on the stain manufacturer.

Every experienced finisher knows that in staining veneers always remain lighter than solid wood, and that such differences must be eliminated by different manipulations. This can be done by adding a second coat of stain, using either the same stain or some oil or spirit stain. An experienced stainer can prevent the darkening of cross-grained wood or carvings by moistening the wood with water just before staining to prevent the stain from penetrating too deeply. It is true that moistening the wood prevents irregularity in final effect of stains to some extent.

All vivid stains containing many alkaline ingredients or even potassium chromate should be avoided, as they fade rapidly under the influence of light and show many drawbacks which only appear after a long time. For example, the chromate and the soda in the hydroxide destroy the shellac layer, and with very strong solutions of these chemicals yellow and gray spots appear after a time, which are hard to eliminate.

Stains from coal-tar dyes have the disadvantage of leaving the pores in the wood lighter than the rest of the wood, but this can be remedied by waxing the surface after staining. Too much wax should not be used, as then the pores become too dark and the surface of the wood a dirty brown appearance.



Miscellaneous Constructive Details of a Bungalow of Picturesque Design

To Be Answered by the Architect

Some of the Many Questions Which Are Frequently Asked by the Young and Inexperienced House Builder

By W. Livingston Larned

"WE have heard so much of 'Rooms with Southern Exposure.' Everybody seems to agree that they are preferable. Can't you arrange to have all of ours that way?"

"If it's possible, we would like to have the guest room, wherever you put it, so arranged that we can turn it into a nursery or a conservatory, or something like that, in case the guests don't come, you know."

"Oh, please do cut the roof up into a whole lot of funny shapes. I once saw a building like that in Venice or somewhere and I thought it did look too cute."

"We must have a butler's pantry. However, I'm willing to admit that until John gets more salary we shan't be able to go to the expense of a butler. They aren't necessary, are they, when there's only two in the family?"

"So this is the first floor plan and this is the second? How funny! They look very much the same. You know what I mean—with rooms and things and all drawn in those peculiar straight lines. How can you ever tell them apart?"

"Oh, dear, you architects are all alike. I was just looking over the list and you've gone and made us buy fifteen door knobs. I don't believe a house has that many doors. Try and be economical, now, won't you?"

"What's the use of storm doors on this bungalow? You know as well as I do, that we never have any very severe storms in this section of the country. I'd cross those off."

"You have forgotten the most important thing. Why—why did you? There was to be a push button under the dining room table so that all I have to do is push and the servant comes in. It makes one's guests so curious."

"You only have one old-fashioned fireplace. We wanted one in each of the rooms, and perhaps two in the big living room, in case my mother comes to stay with us. And the fire-dogs—you've left those out entirely."

"I was just thinking—wouldn't it be a novel idea if you could arrange a trick hole in the wall in our room, where I could keep my sewing machine when I'm not using it—a lever or some sort of a jigger? I could work it, and the machine would disappear. No one has ever tried that."

"Now, don't try to fool us. I had a grandfather who was in the building business and he told me lots and lots of things. There would be room for a large closet right under the stairs. Why, you could almost build another little parlor."

"What's that—you call this a 'perspective drawing'? I suppose that's some fancy, highfalootin' name that will make it cost about three or four times as much as it really should."

"Couldn't you throw in a greenhouse and a pergola and a walk down to the pigeon-house, without it costing us anything extra? It seems to me that when folks give you a whole house to draw, you could do those little things—just as a favor and to show your appreciation. It would only take you a minute."

"In your floor plan you don't show any tiles in the bath room. I never heard of such a thing. I might as well tell you—frankly—your plans look terribly bare to me."

A Handsome Private Residence

One of the latest additions to what is known as "Millionaires' Row" in New York City is the new six-story residence designed by Architect Guy Lowell, to cost $300,000, and to be erected at the northeast corner of Fifth Avenue and Eighty-sixth Street. It will stand on a plot 50 x 100 ft. in area, will have a façade of brick and limestone in the French Renaissance style of architecture and will be ornamented with a balcony on the sixth floor. There will be a massive entrance hall of marble with a great staircase in the center and on the second floor will be a gallery, library, drawing room, and billiard room. The plans have recently been filed with the Bureau of Buildings.

A good slate should be both hard and tough. If it be too soft the nail holes soon become enlarged and the slate works loose.



Some Aspects of Modern Shingling

Scaffolds and Various Ways of Using Them — Toe-Laths and Roof Jacks

By Edward H. Crussell

ANOTHER item to be considered in connection with our present theme is scaffolding. On a new building a scaffold is usually required when putting up the cornice, and it is best to build this scaffold at such a height that the first two or three rows of shingles may be put on from it. There are many shinglers, however, who when working on a roof of low pitch prefer to get right onto it at the start. That is, they will shingle a piece 3 or 4 ft. long from the scaffold or ladder, make themselves a small stool, climb up onto the roof and work forward from that point, preferring to sit on the roof rather than stand on the scaffold.

In repair jobs the ability to work on the roof from the commencement is something to be desired, as it enables the workman to avoid the expense of building a scaffold which can only be used for laying the first few courses. Putting up a scaffold on purpose to shingle from may generally be regarded as unnecessary expense. In many cases it would be cheaper to shingle the entire length of the building from a ladder, awkward as that method is, than to build a scaffold for that purpose alone.

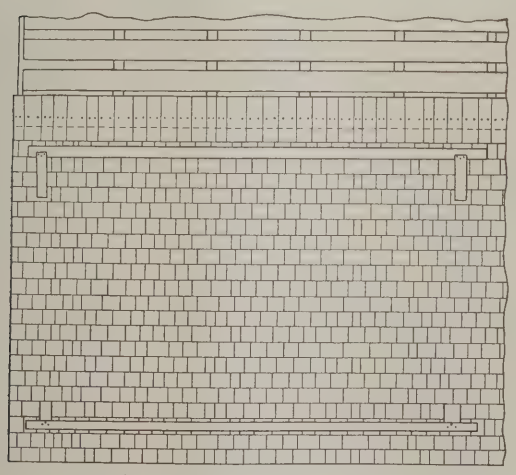


Fig. 6—Method of Fastening Toe Lath

One way of avoiding scaffold expense is to leave off several rows of roof boards about 3 ft. up from the eaves and work from inside the roof while shingling the first few courses. The writer, when a young fellow, gained some local fame by suggesting this method when reshingling the roof of an old covered bridge. The bridge was close-boarded on the sides and would have been a difficult thing to scaffold. The old-timers said, it took a kid with more nerve than brains to suggest that some of the roof boards be knocked off so that the first rows of shingles might be laid without a scaffold.

There are many methods of scaffolding that may be used after the roof has been started, the writer knows of one contractor who used to fasten a two-by-four on the roof with forty-penny nails. After the roof was finished and the two-by-fours removed, the holes made in the shingles by the nails were filled with plugs of wood whittled to

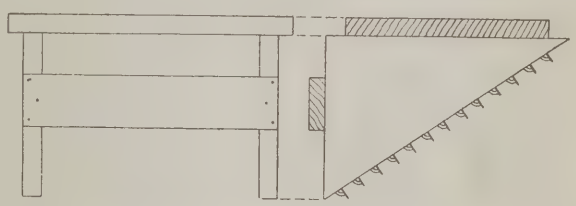


Fig. 7—Side and End Elevations of Shingler's Seat

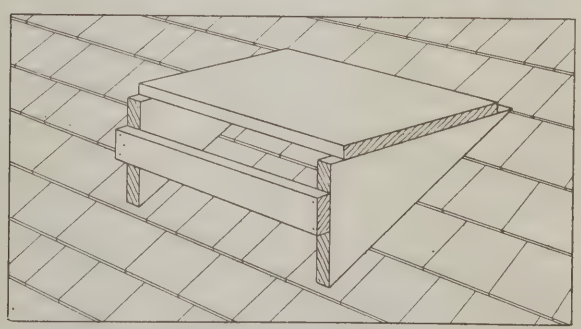


Fig. 8—Shingler's Seat as it Appears on the Roof

*Copyrighted 1916 by Edward H. Crussell.

shape, driven in and cut off flush. Can you beat it?

Scaffolds used on the roof surface are usually called toe-laths, and in modern shingling are used more for the purpose of getting about the roof easily than they are to work from. On roofs of one-quarter pitch or less no toe-laths are needed, the shingler being able to get about on this pitch of roof with nothing but his seat, or roof-jack, as some prefer to call it. On roofs of steeper pitch it is better for the average workman to use toe-laths, although the professional shingler thinks nothing of getting around on a one-third pitch roof without their aid.

Toe Lath Used for Safety

As already stated, the toe-laths are used more for safety and ease in getting about the roof than they are to work from, so we usually space them about 7 ft. apart. This makes it easy for a man to scramble from one to the other in getting up or down a roof; and if his seat should slip (an unlikely occurrence), or if he should drop his hatchet, there is less chance for someone to get hurt thereby.

In Fig. 6 is shown the common method of fastening the toe-lath. The two-by-four, or whatever is to be used, is laid on the roof and a shingle is fastened to it near each end, as shown in the upper portion of the illustration. The top of the shingle points down the roof and about 1 in. of the butt end is fastened securely to the two-by-four with several shingle nails. The two-by-four is then turned over and the upper ends of the shingles are fastened to the roof boards. The shingles should be so placed on the two-by-four as to cover a joint in the proper manner when they are turned over onto the roof and naturally take the place of a shingle in the course immediately above the toe-lath. Of course, several extra nails are driven into these shingles—the ordinary nailing not being sufficient.

A toe-lath is shown, fastened in place as it appears on the roof, in the lower portion of Fig. 6. To remove it after the roof is finished the shingles that hold it are sawn off on a line with the others in that course.

Method of Fastening Toe Lath

This method of fastening the toe-lath was used by the writer for a number of years, until the proprietor on one job objected to its use, claiming that the short shingle made a weak spot in the roof. Although not entirely agreeing with his ideas, it was thought better to humor him, if possible, and so instead of using shingles for fastening the toe-lath we used strips of galvanized iron about 2½ in. wide, put on in the same manner as the shingles but covered entirely by the following course. To remove these toe-laths the strips of iron are cut with a pair of snips close up to the covering course of shingles.

This method of fastening the toe-lath has a number of things to recommend it. One advantage is, the toe-laths may be prepared with the iron strips before they are needed, thus avoiding delay, besides which scrap pieces of material of different length and thickness may be more easily utilized.

The shingler's seat is a simple affair, made in different ways according to the ideas of the user. A common form is shown in side and end elevation in Fig. 7 and in place on the roof in Fig. 8. The two side pieces are made from scraps of 1-in. board cut to the pitch of the roof. The top is formed of a piece about 10 in. wide and 14 in. long, or sometimes two wide shingles are placed butt to tip and used for the top of the stool. The small strip on the rear is used chiefly as a handle by which to move the stool. The workman just reaches backward and hitches the stool forward as he moves.

To prevent the stool slipping, nails are driven into the side pieces, as shown in Fig. 7. The head of the nail is left projecting about ¼ in. and is then bent over as shown. The size of the nails in Fig. 7 are somewhat exaggerated to show the method more clearly; and particular mention is made of the method because the uninitiated often try to use the points of the nails, toenailing them through the sides of the boards so that they project slightly below. This does very well when the stool is first made, but after a little use the nails either bend or are pushed back into the wood and away goes both seat and user. Toothed plates, pointed woodscrews and other devices are used to prevent these seats slipping, but the writer has always found Fig. 7 to fulfill every requirement, especially when used in conjunction with the toe-laths already mentioned.

Alternative for Toe Lath

Without the toe-lath on a steep roof the shingler needs two seats unless he uses spiked shoes, something to which the man responsible for the job will usually object. The professional shingler will argue that he has never split a shingle with his spiked shoes, which may or may not be so. In hot, dry weather it is easy enough to split the shingles by walking on them with ordinary shoes, and spiked shoes certainly do not help the matter any. When much shingling is to be done it pays to invest in a pair of rubber-soled tennis or "gym" shoes. With these you can get around on the average roof almost as well as with the spiked shoes, besides which they are easier on the roof and easier on the feet than the ordinary shoe. Anyone who has done much of it knows that walking around for several days on a roof is an entirely different matter to walking on the level.

(*To be continued.*)

South Dakota Master Builders' Association

A Master Builders' Association has just been organized in Watertown, S. D., with officers for the ensuing year as follows:

President.....A. A. Gray of Watertown
Vice-President.....S. W. Jonason of Aberdeen
Secretary-Treasurer....Herman Stolte of Redfield

A constitution and by-laws have been adopted and a committee on membership appointed, who at once began active operations with a view to securing a "100 per cent organization" of contractors throughout the State. The several sessions were followed by a banquet at which Col. Lee Stover was toastmaster, the hosts being the materialmen of the State. Among the prominent speakers were Eugene Young, secretary of the Builders' Exchange of Minneapolis, who gave a general talk on "Co-operation," John R. Hanten and M. A. Hockman, the latter advocating an architects' license law.



Building a Modern Low-Cost Bungalow of Hollow Tile Construction

Various Details Which Will Be Found of Unusual Interest to the Builder Who May Be Called Upon to Erect Fire-Proof Construction in the Smaller Places of the Country

By Edwin G. Zorn

MARY and John are about to embark on the matrimonial seas. They have been planning for weeks, yes months, the details of their future paradise, but there is one question which they have not as yet been able to answer to their satisfaction and which has caused them considerable anxiety—where shall we live? Mary is opposed to entering upon her duties as a housewife in a "two by four" flat, while John, who is an ambitious fellow having saved through his industry a small amount of money, would like nothing better than to build a home in which he and Mary could begin their partnership. But his capital is small and he has high ideals. He would not build a "cheap" home—he would rather rent a place than do that—yet he would build if he could find a design and construction that would give him a substantially built home with modern conveniences at a low cost.



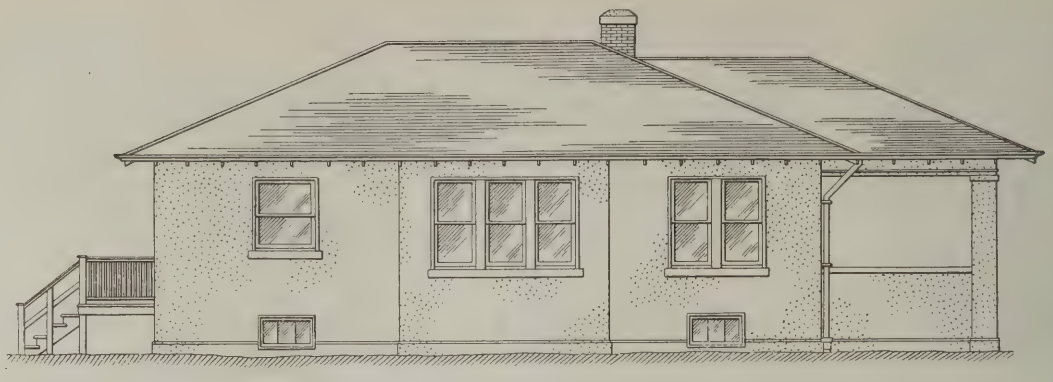
General View of the Completed Hollow Tile Bungalow

Did they realize their ambitions—Mary and John? The accompanying illustrations of a bunglow tell the story. They did, and in so doing, have blazed the path to a well-built, low-cost home, a house such as many would like to build if they only knew it were possible with the money at their disposal. And so, in order that some may learn of this fact and that the man who can most profit by the erection of these homes—the constractor—may have something tangible to show a prospective builder of a low-cost home, the following description and plans are given.

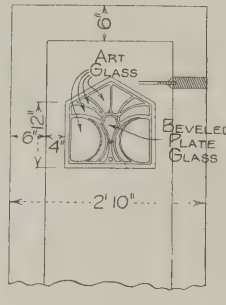
The bungalow shown herewith was built in Hammond, Ind., a town adjoining, in fact, almost a suburb of Chicago, the architect being Karl D. Norris of East Chicago, Ind. It has masonry walls, is of attractive design, well built, fire-proof and has a well finished interior and exterior. The main part of the building, not including the porches, is 26 ft. wide and 37½ ft. long, measuring 12 ft. from the grade line to the eaves.

The foundation is composed of conduit seconds, a material that was originally intended to house telephone or telegraph wires, but which, because of some minor defect such as a slight imperfection in the glaze or a knick out of one end, were rejected at the manufacturer's yard by the buyer's inspector. These conduits are made of fire clay, vitrified in a kiln at a high temperature and are amply strong to carry the load imposed upon them in a building of one or even two stories. They may be obtained very cheaply and make an excellent foundation, thoroughly waterproof. These conduits, eight inches in thickness, were laid up with cement mortar on concrete footings, and upon them were placed the walls of the building which are composed of eight inch hollow clay building tile.

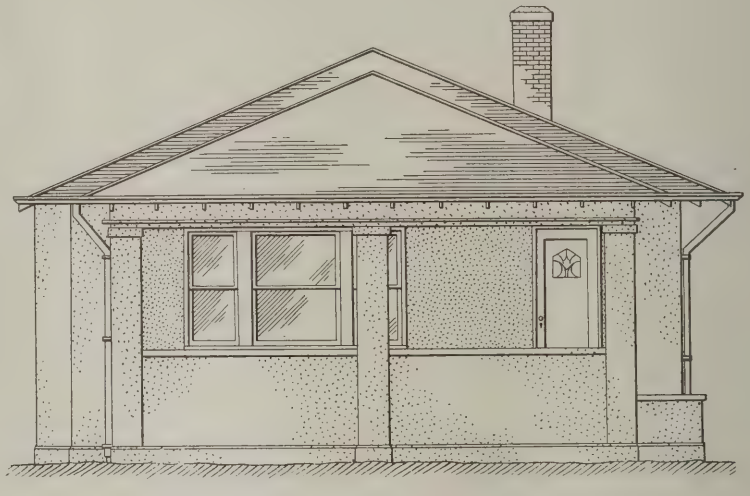
When finished these walls were covered with a coat of rough cast stucco which was applied directly to the surface of the tile. The exposed woodwork on the exterior of the house has been painted a rich brown, and this, together with the rough gray of



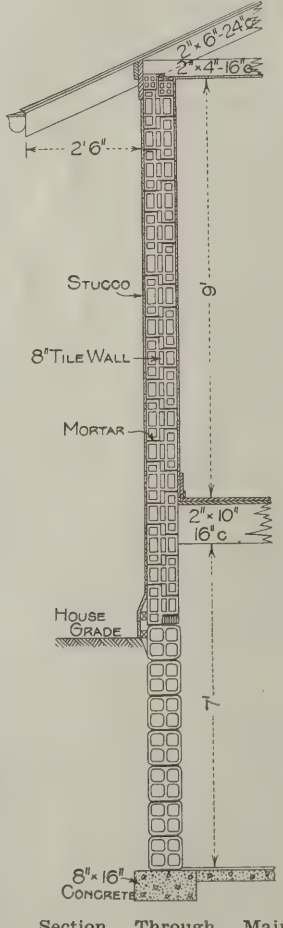
Left Side Elevation of the Building—Scale ⅛ In. to the Foot



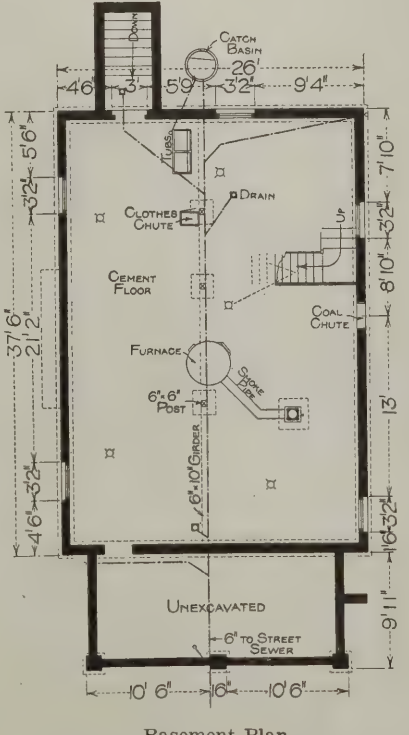
Detail of Upper Portion of the Front Door —Scale ⅜ In. to the Foot



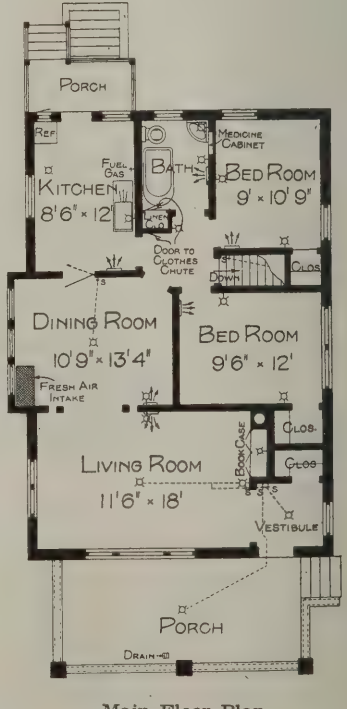
Front Elevation—Scale ⅛ In. to the Foot



Section Through Main Wall—Scale ¼ In. to the Foot



Basement Plan



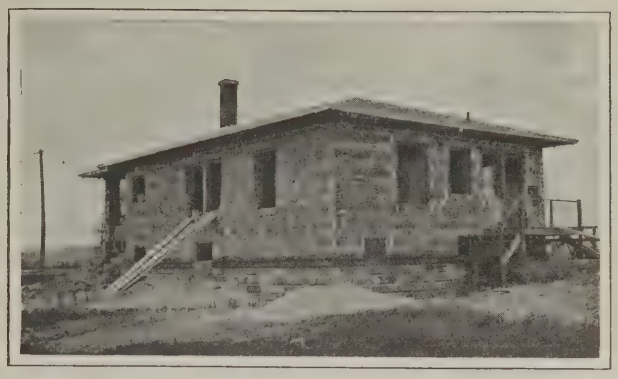
Main Floor Plan

Scale 1/16 In. to the Foot

Building a Modern Low-Cost Bungalow of Hollow Tile Construction—Plans, Elevations and Details



VIEW OF THE SOUTH SIDE AFTER BEING COATED WITH STUCCO



REAR VIEW OF THE HOUSE BEFORE THE STUCCO WAS APPLIED

the stucco, the green roof and the red pressed brick chimney, form a most pleasing color combination.

The interior of the house is taken up by a living room, dining room, kitchen, bath and two bedrooms. The entrance to the house is through a vestibule which has a large window in the south wall, while opposite the door is a closet for hanging coats and wraps. From the vestibule, access may be had to the living room which extends very nearly the entire width of the house. The floor of this room is oak as is also the trim, which is continuous; that is, it consists of a broad band of oak placed at the proper distance from the ceiling and extending in one seemingly continuous strip around the entire room. In a niche at the south end of the room is a built-in bookcase of oak. The plastered walls in this, as in all of the other rooms, have a sand float finish, the plaster being applied directly to the surface of the tile on all of the outside walls. The interior partitions were built of studding and wood lath. The electric light fixtures in the living room are of brass, very simple and plain, but serviceable.

A colonnade separates the living from the dining room, the most striking feature of the latter being its well-lit interior which is due to the fact that this room has a bay on the north side with three windows in it. Unlike the living room, the floors in the dining room are of white pine, but so well has the painter done his work that the difference can only be seen by the trained eye. The floors match perfectly in the doorway between both rooms. In the dining room an inverted light fixture hangs from an elliptical, imitation-beamed ceiling. The trim is of oak, the walls below the plate rail being paneled with strips of the same material.

The kitchen is separated from the dining room by a swinging door. The floor in this, as well as the bedrooms, is of white pine, well laid and without blemish. The trim is also of pine, the wall below the chair rail being painted in ochre while above it is white. This kitchen has many conveniences, notable among which is a small door in the east wall opening onto the back porch through which the ice may be placed in the box without the necessity of the iceman coming into the kitchen. Opening onto the back porch, and immediately at the head of the stairs, may be found a built-in chamber for housing the garbage can. We hear so much about "swat-the-fly" campaigns, but here is an instance where the fly has been put to rout without the beating of drums and the blaring of trumpets. This chamber is thoroughly sanitary, being lined with white enameled sheet iron. It also has a cast-iron door which may be shut tight at all times, a most welcome provision for hot summer weather.

Next to the kitchen is the bath room, which is a surprise to all who visit this home. Considering the total cost of the building, this room is a marvel of conveniences and finish. The floor is laid in mosaic tile, while the walls are plastered, that part below the chair rail being marked off in imitation tiles. Above the chair rail, the walls are enameled white over a sand float finished plaster wall, the woodwork also being enameled white. The plumbing fixtures are modern in every respect, the most notable feature being a shower bath. In the west wall and next to the floor, is a clothes chute leading to the basement through which all soiled clothing may be thrust to a receptacle below where they will be ready for the attention of the housewife and her helper, thus eliminating many steps and the carry-



THE SOUTH SIDE OF THE HOUSE BEFORE THE EXTERIOR COATING OF STUCCO HAD BEEN APPLIED



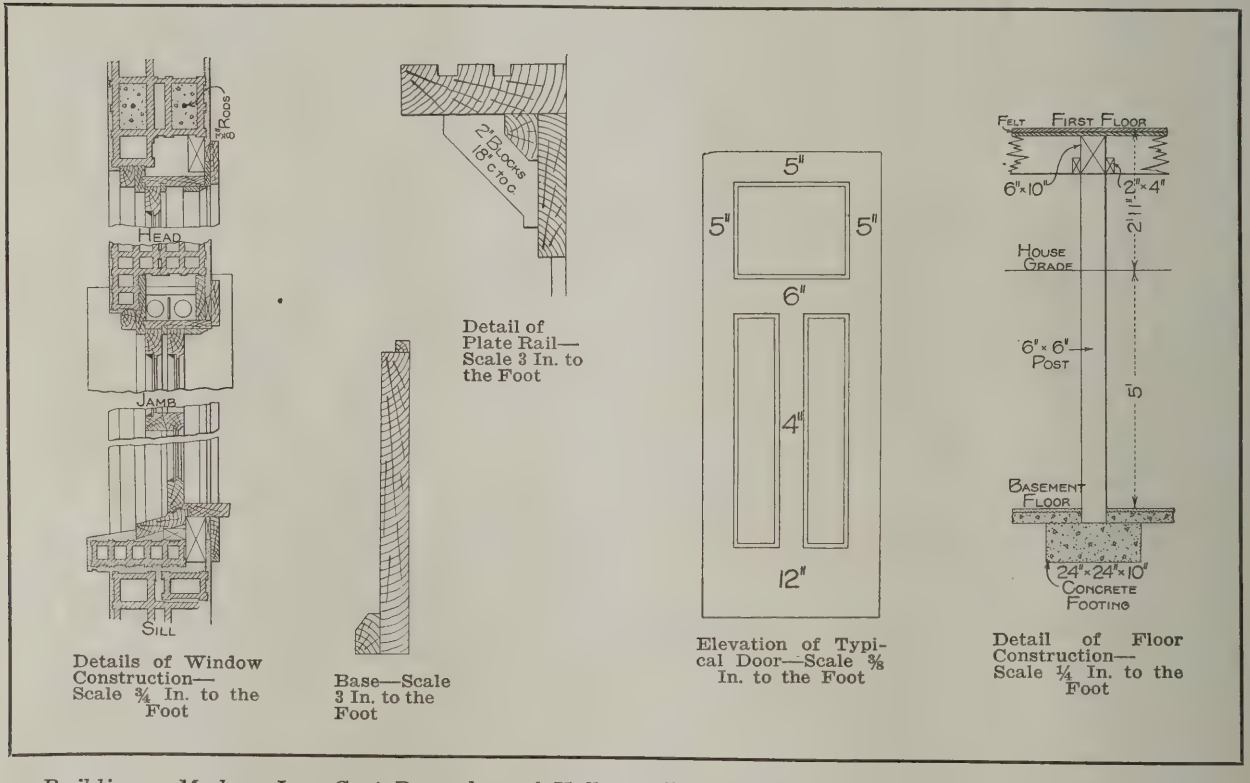
CORNER OF THE BASEMENT SHOWING CONDUITS AND THE HOLLOW WALLS LAID UPON THEM

ing of a cumbercome basket or bag to the basement on washday.

The bedrooms, of which there are two, are located on the south side of the building. The floors are of white pine, well laid, stained and varnished. The larger bedroom has a double window while the smaller back room has one window in both its north and south walls. Between the bedrooms is located the stairway to the basement.

Nor has the basement been neglected in the planning of this model home. With a well drained cement floor, electric lights and stationary tubs it compares well with the rest of the house in convenient arrangement. Here is also located the hot-air furnace which heats the home in cold weather. A cast-iron coal chute in the east wall permits the coal to be thrown into the basement without injuring or discoloring the wall.

One of the most notable features of the exterior of the house is the spacious front porch which is



Building a Modern Low-Cost Bungalow of Hollow Tile Construction—Various Constructive Details

largely built of hollow tile, thus demonstrating the flexibility of that material. This porch has cement steps and a cement floor, and is screened in for summer living. A large electric light has been placed in the ceiling which is built of siding dressed and match, beaded center and side. When finished, this ceiling was varnished.

The roof is constructed of 2 x 4 in. tie beams, spaced 16 in. apart on centers, and 2 x 6 rafters, spaced 24 in. on centers, over which was placed car siding to form a sheeting. Green composition, fireproof shingles were then laid over this sheeting. The roof is drained with galvanized iron gutters, while flashing, valleys and ridges of the same material have been laid so as to make a thoroughly waterproof roof. A red pressed-brick chimney topped with a stone cap finishes off this part of the building.

Had this house been built of frame, the fact that it cost only $2,755 would have little interest for the contractor, simply because there are thousands and thousands of small homes being built of that material throughout this country for the figure named and even less. But the walls of this house are of masonry—hollow clay building tile—and this is what makes the home here shown worthy of more than a passing interest.

It is unfortunate that the merits of hollow tile are so little known among builders. While the fact that this material makes a building that is perfectly dry at all times, warm in winter and cool in summer, one that requires little or no repairs, should be of vital interest to the contractor because it makes satisfied clients, there are advantages that appeal more directly to his pocket-book than perhaps those above mentioned. Just one instance of the saving to the contractor that may be effected through the use of hollow tile is graphically illustrated in the following comparison of labor costs which were carefully compiled by a reliable authority.

The average mason will lay about 1500 brick in a day of eight hours, while he will lay 250 8 x 8 x 12 in. hollow tile. The latter unit being considerably larger than a brick, requires one-fifth as much mortar for laying. Figuring the cost of mason labor at $6 per day with the assistance of a helper who divides his time between two masons, a comparison of labor costs between the two types of wall construction is as follows:

BRICK		HOLLOW TILE	
	Per Day		Per Day
Mason	$6.00	Mason	$6.00
One-half helper	1.80	One-half helper	1.80
Mortar	2.00	Mortar	.75
	$9.80		$8.55

1,500 brick will lay 75 ft. of 12-in. wall at a cost of $9.80

250 tile will lay 125 ft. of 12-in. wall at a cost of 8.55
75 ft. of brick at $9.80 amounts to $.13 per foot.
125 ft. of tile at 8.55 amounts to .068 per foot.

Difference in cost of brick over tile, $.062 per foot.

In these figures is contained the reason why the bungalow shown herewith could be built of tile for the low figure mentioned, which is nearly identical



Building a Modern Low Cost Bungalow of Hollow Tile Construction—Porch View Before Stucco Was Applied

to what this same building might have cost had it been built of frame.

The itemized bid of the successful contractor follows, and although there might have been a few extras, the owner states that the work was done for approximately the total shown below:

Masonry	$555.00
Carpentry	900.00
Excavating	25.00
Plastering, inside	150.00
Plastering, outside (stucco)	120.00
Painting	125.00
Sheet Metal	40.00
Plumbing	275.00
Heating	150.00
Mosaic Tile	25.00
Fixtures and Hardware	150.00
Electric Wiring	40.00
Miscellaneous	200.00
Total	$2,755.00

Another interesting fact about this house is that in building it the contractor who did the work "tackled" his first job of hollow tile and, as may be seen, turned out a very creditable piece of work. The next time he undertakes a job in which this material is used, there is no doubt but that he will finish with a larger profit and with a better piece of work, made possible by the experience gained from his first job. And so it may be seen that long experience and specially trained masons are not required for the successful performance of work involving the use of hollow tile, although in this, like in all other lines of endeavor, experience, skill and specialization make for still larger profits.

At Sacramento, Cal., the brick contractors met recently at a dinner, with D. A. Cannon as toastmaster, and after exchanging views on trade conditions, it was decided to form an organization, preliminary action being taken toward that end.

Shrinkage in Tenement House Construction

One feature of the local building situation and one which may be traceable in large measure to the high cost of structural materials is the effect upon tenement house construction as reflected in the statistics covering the first three months of the current year. During this period, according to the Tenement House Department, there were 400 apartment houses planned, costing $14,822,000, as against 498 houses, costing $18,124,950, in the first quarter of last year.

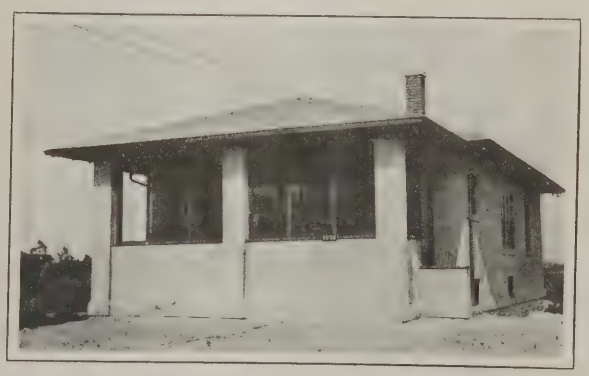
In the Borough of Manhattan there was a decrease of 10 per cent; in the Bronx 44 per cent, in Brooklyn 31 per cent and in Richmond 50 per cent, the Borough of Queens being the only one of the five constituting Greater New York to show a larger volume of tenement house construction than in the corresponding period a year ago.

The following compilation from the records of the Tenement House Department of tenements projected during the first quarter ending March 31, 1916, and a comparison with the first quarter of 1915, shows at a glance the current production of housings in all boroughs:

	Bldgs.	Rooms	Est. Cost
Manhattan—			
1915	50	7,200	$5,480,500
1916	45	5,899	4,943,500
Bronx—			
1915	155	13,600	6,563,250
1916	87	8,297	4,250,000
Brooklyn—			
1915	255	13,773	5,380,200
1916	176	10,474	4,379,500
Queens—			
1915	36	1,761	688,500
1916	91	3,476	1,244,000
Richmond—			
1915	2	29	12,500
1916	1	17	28,163

The better showing of the Borough of Queens is no doubt due in large measure to the comparative low price of land and the prospects of an advance in property when the new subways are in operation.

A study of the figures above leads to the conclusion that while the drift of Manhattan is toward larger units and bulky rentals, the other boroughs



The Appearance of the Completed Cottage Looking Toward the Front Entrance Steps

are providing the housings for the masses, with whom $25 is the average maximum monthly rental they can conveniently pay.

According to the Bureau of Statistics and Information of the New York State Department of Labor, there were fewer unemployed in February, 1916, than in any other February in the last four years, except in the year 1913.

How to Estimate Wall Board Work

Accurate Measurements Essential—Brief Specifications—Applying the Panels—Some Figures of Cost

By Joseph A. Poesl

EVERY contractor is well aware of the customary inaccuracy of estimates in the building trade. The trouble lies mainly in the tendency to guess at quantities and measuring by the estimator. The only way to get accurate estimates is by careful measuring, for even expert builders often go amiss when they rely so absolutely upon the guesswork of which they usually feel so proud.

It is doubly essential that careful measuring and estimating be practiced in connection with wall board, due to the comparative youth of the industry itself and the lack of general knowledge of it, unlike lath and plaster. The carpenter has just about been educated to accepting the very nearly standardized method of construction which the manufacturers of wall board have been advocating for years. Only several years ago, when wall board was not so well known as it is to-day, carpenters looked disdainfully upon and cast aside the instructions which the manufacturers religiously furnished with every order to insure satisfaction to the user. As a result the carpenter came to grief. But what did he do? Merely condemned the board, not for a moment considering himself the real cause of the trouble.

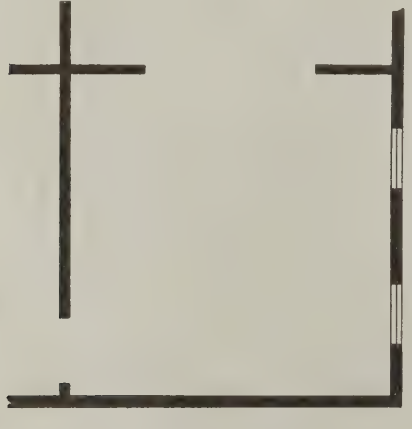


Fig. 1—Outline of a Dining Room

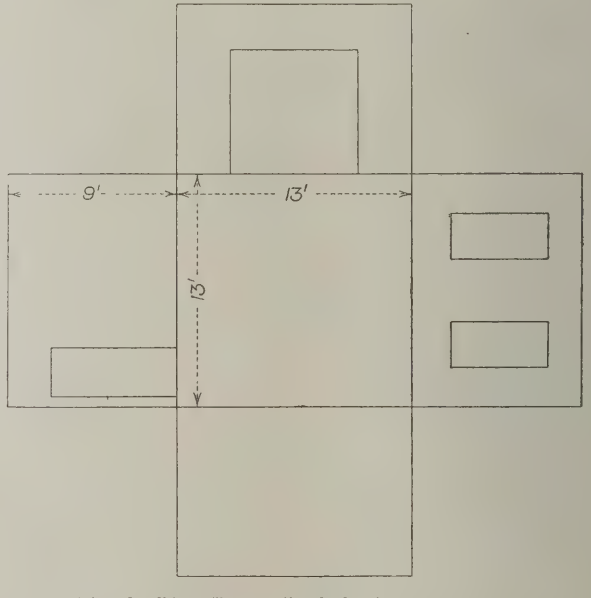


Fig. 2—The "Layout" of the Dining Room

How to Estimate Wall Board Work

Now, the estimator should be able to figure up the dimensions of all materials to be used in wall board work, know the cost and possess a thorough knowledge of the details of this type of construction. So, for the benefit of all those who have had little experience with wall board, I give brief specifications for wall board construction.

Studding and joists to be evenly spaced; preferably 16 in. or 24 in. on centers.

Headers must be provided wherever necessary, so that all edges of every panel can be nailed; also at top edge of baseboard and behind such moldings as chair rail and picture moldings. Use 2 x 2 or 2 x 4 in. hemlock for headers.

To apply panels to walls, begin at top in center of panel; put in brads and then nail edges. For ceiling, first nail should be driven in center of panel, followed by rest of brads and nails on edges.

Nail every 6 or 8 in. to intermediate studs and joists; on edges, every 3 in. and ⅜ in. from edge.

For intermediate nailing, use 1 in. 16-gage brads. These to be slightly countersunk for stopping. Use 1⅛ in. 16-gage flat-head nails for edges.

After decorating with any kind of good paint, cover the joints with finished decorative strips of wood. These strips should never be less in size than ⅜ x 1⅞ in.

Over old plaster follow above instructions, nailing directly into the plaster and lath without regard to location of studs or joists.

On brick or concrete walls, put on 1 x 2 in. hemlock furring strips in the manner of studs and headers and apply as specified in the foregoing.

Although the fundamentals of wall board construction are pretty well established, improvements are constantly being made to reduce the labor item, which is a big factor in the cost. For instance, the usual way of putting up wall board is for the carpenter to measure up a panel, cut it to fit, if necessary, and nail it to the studding of joists. There is much lost motion in this process. The bricklayer does not carry up the bricks he uses—a laborer relieves him of this necessity. He, the high-priced

mechanic, is always kept well supplied with all his requirements by the laborer—the cheap man. This means less waste motion and closer to 100 per cent efficiency.

The same applies to wall board. A first-class man should measure, lay out the work and fit the panels, while unskilled, or apprentice workmen do the cutting, nailing and other things that do not require expert workmen.

What you want to do first when you get a set of plans to figure on, is to see whether the architect has supplied plans for paneling the rooms. If not, it is necessary that you do so before an estimate can be made, for in a wall board room the panel arrangement is as vitally important as the location of doors and windows. In an article in the February issue of THE BUILDING AGE I gave suggestions for wall board paneling which would be of assistance in a case like this. It will help you to work out economical as well as attractive arrangements for the various rooms.

I will make use of the practical example, explained therein as the most convenient means of showing how to estimate wall board work.

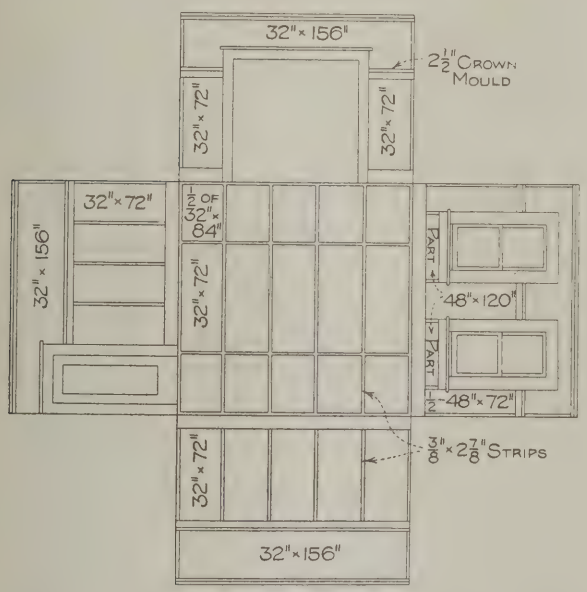


Fig. 3—Panel Treatment Suggested for Dining Room

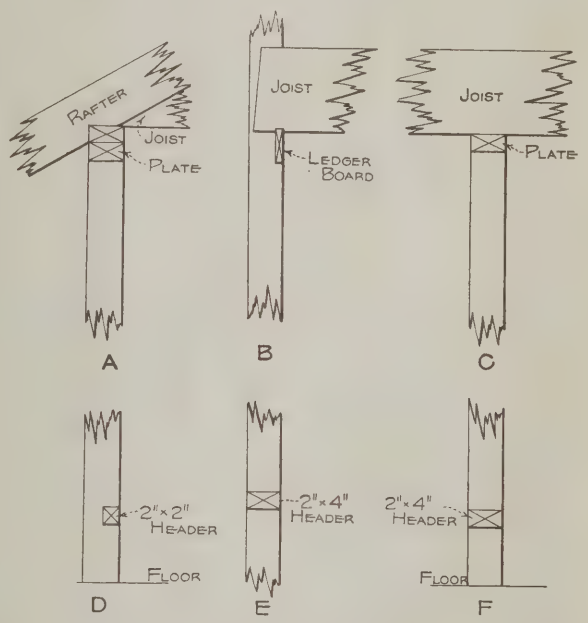


Fig. 4—Suggested Details of Wall and Partition Construction

How to Estimate Wall Board Work

Suppose we had a dining room, as in Fig. 1, on which an estimate was desired. We first lay it out as in Fig. 2, and design a panel treatment as in Fig. 3. Observe that a plate rail and crown molding are specified in addition to the regular decorative strips.

Knowing just where each panel is to be located, we can readily ascertain how many headers will be needed, assuming the studs and joists are 16 in. on centers. One row will come at the top of the baseboard and one behind the plate rail. The wall plate and ledger board will answer for a header for the crown molding. On the ceiling a row will be inserted between the joists at the ends of the room and where the two panel joints cross the room.

The labor and material cost of one 2 x 2 in. header 14 in. long is about 2½ cents; and as the room takes 76, the cost of headers will come to a total of $1.91.

We now make a list of the panels that will be required, keeping ceiling and walls separated for convenience later on when applying the board.

Ceiling

5—32 x 84..... 93⅓
5—32 x 72..... 80

Walls

12—32 x 72.....192
4—32 x 156.....138⅔
1—48 x 120..... 40

544 sq. ft.

Most wall board is sold at about 3c. a square foot delivered, which will bring the cost of the requirements of this room to $16.32.

The nails needed to apply this board are: 6 lb. of 1⅛ in. flat-head nails and 1 lb. of 1 in. 16-gage brads. Both at 5c. a pound, come to 35c.

One man can put up the wall board in about five hours, figuring that an average workman can put up a trifle more than 100 sq. ft. in one hour. This, at 50c. an hour, will mean $2.50 for the application.

Then ascertain how much molding and decorative strips will be necessary. Of the crown molding 55 lin. ft., of the plate rail 40 lin. ft. and of the decorative strips 200 lin. ft. will be required. The first, at $2.25 a hundred, comes to $1.24; the second, at $4.00, comes to $1.60; and the last, at $1.50, comes to $3.00, making a total of $6.85 for woodwork without labor.

The labor of application will figure to about $4.60, assuming that the cost to apply crown molding is about 2c. a foot, three-member plate rail 5c. and decorative strips, ¾c.

Recapitulating the figures we have the following:

76 headers, 2 x 2 x 14-in., complete, at 2½c.	$1.91
544 sq. ft. of wall board at 3c.	16.32
6 lb. 1⅛-in. flat head nails at 5c.	.30
1 lb. 1-in. brads at 5c.	.05
55 lin. ft. 4-in. three-member plate rail, pine, at 4c.	1.60
40 lin. ft. 3 x 2½-in. crown molding, pine, at 2¼c.	1.24
200 lin. ft. ⅝ x 2⅞-in. decorative strips, pine, at 1½c.	3.00
Labor:	
Wall board	2.50
Moldings	4.60
Total	$31.42

The labor has been figured at $4.00 a day of eight hours. Sometimes a 2 x 4 in. header is used where

it can do duty on both sides of a partition. This is at the top edge of the baseboard and where the frieze line on both sides is at the same height. When a 2 x 4 in. header is used figure the cost at 3½c. apiece. However, half of this must be given to both of the rooms on the opposite sides of the partition. This reduces the cost of each header to 1¾c., and therefore it is well to take this advantage wherever possible. In Fig. 4 is shown, at "D," the common header which is used for outside walls; for partitions where the frieze line is at different heights, or a wainscot is on the opposite side, and for ceilings, Fig. 4 also illustrates how the roof plate, partition plate or cap, and ledger board take the place of headers.

Exhibit of Arkansas Soft Pine

Regarding some of the attractive exhibits at the Complete Building Show recently held in the city of Cleveland, Ohio, and which were referred to in the April number of THE BUILDING AGE, we desire to state that the display shown on page 37, representing the model of a New England cottage built of Arkansas soft pine, was the individual exhibit of the Arkansas Soft Pine Bureau, and not of the Southern Pine Association, as might be inferred from the caption to the half-tone engraving. A portion of the larger cottage in the exhibit shown partially completed indicated the proper frame construction when using Arkansas soft pine. The feature of the display of the Southern Pine Association which occupied space with the Bureau was creosoted wood blocks, etc.

New Building of Interest to Sportsmen

It is expected that work will begin about the middle of May on the eleven-story building which is to occupy a plot 100 x 100 ft. on the corner of Madison Avenue and Forty-fifth Street, New York City. The plans, prepared by architects Starret & Van Vleck, call for a structure in the Italian Renaissance style of architecture and estimated to cost, when completed and ready for occupancy, in the neighborhood of $1,000,000. The exterior will be of limestone for the first two stories, surmounted by a shaft of light colored pressed brick, with terra cotta enrichment beginning on the tenth floor.

A novel feature will be the roof, the parapet walls of which will extend upward, completely concealing the usual roof fixtures, so that from the street the appearance will be very much that of an extra story. On the roof will be a fly-casting tank and camping equipment, and adjoining the pent house will be a rendezvous for guides and sportsmen, fitted up like a lodge in the Adirondacks, with a log interior, a great stone fireplace at one end, a wide porch on the side and hickory furniture. Here hunters may meet their guides, and with the assistance of maps and other information at hand, plan their trips to the woods, the whole scheme being designed to facilitate the booking and outfitting of those bound for the wilds.

In the basement will be located one of the most unique features of this structure—sound-proof rifle ranges. Here sportsmen may try out their rifles and pattern their shotguns. It will be possible to hold target matches in these armored ranges, constructed to admit of firing the highest power rifles with safety and without noise to those outside.

The first seven stories will be used for various sporting goods departments by a well-known concern in the city, and the storeroom on the street floor will have a 21-ft. ceiling. The floor will be of Travertine stone and the walls of limestone. In connection with the show windows many special accessories will be provided, such as running water and tanks to permit the building of mountain scenes in which live fish may be seen and marshes in which live mallards and teal. Special lighting will also be provided for the reproduction of night scenes around the campfire.

Single Inspection of Building Construction in New York City

The bill providing for single inspection of building construction in New York City was passed by the Senate and Assembly on April 12 and as it is an Administration project it is reasonably certain that it will receive the approval of Mayor Mitchell. This will end the confusion and overlapping of orders during the erection of buildings which have caused no end of expense to the real estate interests of the city and retarded in many instances the completion of important building improvements.

The new law creates a Board of Standards and Appeals, to consist of the fire commissioner, five superintendents of buildings, the fire chief, and six other members to be appointed by the mayor, consisting of an architect, a structural engineer, and a builder, each of ten years' experience, and one an architect or structural engineer of fifteen years' experience.

This board is given power to make rules and regulations, inspect buildings, and exercise with respect to buildings situated in the city of New York the same powers as are conferred upon the Industrial Commission by Chapter 719 of the Laws of 1915.

A Board of Appeals, composed of the fire chief and the six appointive members, is also created, to whom is given the right to review a decision of the Board of Appeals by a writ of certiorari.

The fire commissioner is given power to issue orders in conformity with the Building Code, Labor Law, and the rules of the Board of Standard Appeals, and to enforce all laws and ordnances in reference to the use and occupancy of buildings, except tenement houses.

The law is to become operative on October 1.

A sixteen-story office and store building has been planned for erection in West Thirty-seventh Street, New York City, the architect being William H. Gompert, 171 Madison Avenue, New York City.

The fire losses in the United States and Canada in March were, according to the *Journal of Commerce*, $38,680,250, against $18,786,400 in March, of last year.

Apartment House for Four Families

A Popular Style of Multiple Dwelling Having the Appearance of a Commodious Private House

MANY of our readers are likely interested in the design and arrangement of four-family houses, and therefore the study which we illustrate herewith, but which in its external aspect has much the appearance of a large private dwelling, will command their attention. There are twenty rooms in the building, and on another page we show a half plan of the first floor clearly indicating the general arrangement, together with a half plan of the second floor. It will be seen that each family has a commodious living-room, a dining-room, a kitchen, two bedrooms and a bathroom, with a screened porch inclosing the wash trays and which may be utilized as a laundry.



General View of Four-Family Apartment House—Designed by Rex D. Weston, Los Angeles, Cal.

The exterior walls of the building are of stucco and the latter was applied by means of what is known as the cement gun, that is, the plaster or stucco was blown on to the wall by means of compressed air; the dry cement, sand and water being mixed as they were blown from separate tubes. The exterior wall studs were first covered with 1 x 6 in. sheathing put on diagonally and then covered with 5-lb. waterproofing roofing felt lapped like siding and secured to the sheathing with large-headed tacks. Over the felt were placed furring strips, to which expanded metal lath was secured with 2-in. nails placed 6 in. apart. The sheets of metal lath were lapped in both directions and securely tied together by weaving wire in and out through the lapped meshes, thus making a continuous reinforced slab. All corners were wrapped with American Steel & Wire Company's fabric, lapped 4 in. over the expanded metal lath.

On this lath was applied the base coat of stucco ¾ in. thick, composed of one part Portland cement to 4½ parts coarse, well-graded sand, and 10 per cent hydrated lime as a permanent waterproofing, all being applied by means of the compressed air gun as above stated.

The second coat was applied by hand and consisted of one part of Medusa white Portland cement, two parts of white sand and 12 per cent of hydrated lime left in as a sand finish. This stucco was kept wet for about three days to insure proper curing and bonding of both coats. We learn from the architect that it has produced a job without cracks or breaks, "thoroughly monolithic and everlasting."

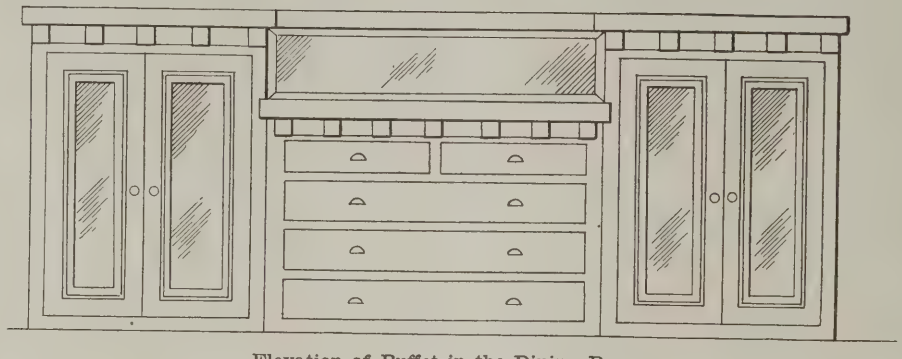
The first floor joists are 2 x 8 in., the second

floor joists 2 x 10 in. and the ceiling joists 2 x 4 in., all placed 16 in. on centers.

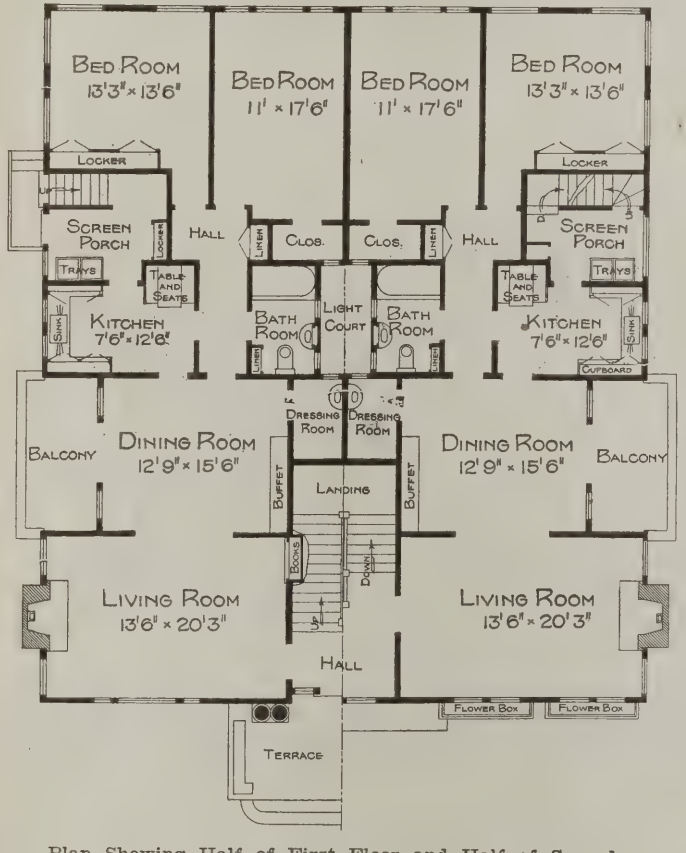
All floor joists are covered with 1 x 6-in. surfaced sub-flooring, on which was placed a heavy layer of waterproofing felt. The finish floor of the main room is 7/8 x 2 in. square, quarter sawn, tongued and grooved oak flooring, with the exception of the front and rear porches, which are covered with 1 x 4-in. tongued and grooved pine flooring. In the

The entrance to the building is prominent and gives a decorative architectural feature to the front façade. The paneled front door with glass side lights of small panes with segmental transom partakes of the colonial in style of architecture. The entrance is sufficiently recessed to form with the projection of the entablature over the columns, a protection from the elements.

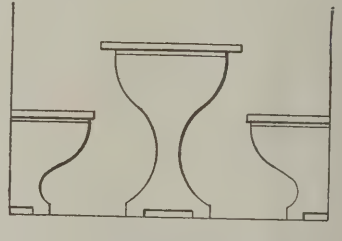
The large casement windows furnish an abund-



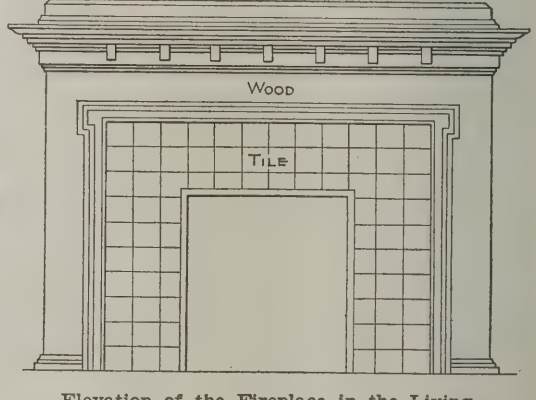
Elevation of Buffet in the Dining Room



Plan Showing Half of First Floor and Half of Second Floor—Scale 1/16 In. to the Foot



End View of Seats and Table in Breakfast Nook in the Kitchen



Elevation of the Fireplace in the Living Rooms of the Four Apartments

Apartment House for Four Families—Floor Plan and Various Constructive Details

partition between the apartments on the first and second floors was placed a layer of Natural Linofelt quilted between two sheets of strong building paper and the same was laid on the second floor joist.

The rafters are covered with 1 x 6-in. surfaced sheathing laid tight and over which was placed a heavy layer of waterproofing felt. This in turn was covered with No. 1 cedar shingles laid with an exposure of 4½ in. to the weather.

ance of light and add materially to the pleasing effects produced.

The living room at the front of the house has a Colonial fireplace opposite the entrance doorway, the design being in keeping with the surroundings. The fireplace is constructed of buff colored brick with Colonial mantel shelf. The French doors leading from the dining-room into the balcony at the side are extra large, and it is possible to convert

the balcony into an open-air sleeping porch if so desired. Both the living and the dining-rooms have polished hardwood floors and woodwork finished in white enamel. The doors and trim are mahogany. The electric fixtures and hardware are of a silver and bronze combination, but all harmonizing with the general scheme of interior decoration.

The center of the kitchen is but a few steps from the dining-room and contains built-in cupboards, sink and breakfast nook, which is nothing more than a recess with table and seats on either side as indicated in the detail shown herewith. The drainboard of the sink is of sanitary composition. On one side of the sink is a deep cupboard for dishes and on the other side a shallow cupboard for supplies, etc. Back of the kitchen is a screened porch containing wash trays, already referred to, and from the upper porches the rear stairway leads down, all being inclosed and separate from the apartments on the first floor.

The two large bedrooms shown at the rear are well lighted and ventilated and are finished in white enamel with paper walls and tinted ceilings.

The bathroom is finished in white enameled woodwork and smooth plaster wainscoting extending up to the top of the doors. The floor is of tile with a tile base around the room. The bathtub is built-in with tile on the front running from the rim of the tub to the floor.

The four-family house here shown was erected in accordance with drawings prepared by Rex D. Weston, 507 Chamber of Commerce Building, Los Angeles, Cal., and cost complete $6,950, the structure having been erected during the past summer.

Bevels for Rafters and Hoppers

A Method Embracing Every Possible Condition the Carpenter Is Likely to Encounter in His Work

By Alva Cole, C.E.*

IN view of the discussion which has been appearing recently in the columns of this paper I present herewith a method of finding the bevels and lengths of rafters and boards for roofs and hoppers that embraces every possible condition which may come to the carpenter. The corner of the building or hopper may be square, obtuse or acute angle; each corner may be different from the others, and the pitch of roof or slope of hopper may be flat, medium or steep; in fact, any shape bounded by straight lines, and of any slant is easily executed. Every required length and bevel can be found easily and with accuracy, depending upon the care and skill of the man who prepares the working diagram. The same theory always applies and is based on established principles of what is known as descriptive geometry.

The several diagrams, Figs. 1 to 9, inclusive, represent the different conditions that may prevail; but only one diagram is necessary for any particular job to be done, and the conditions on that job will decide which diagram must be used. All the diagrams are lettered alike, and to use this method we proceed as follows:

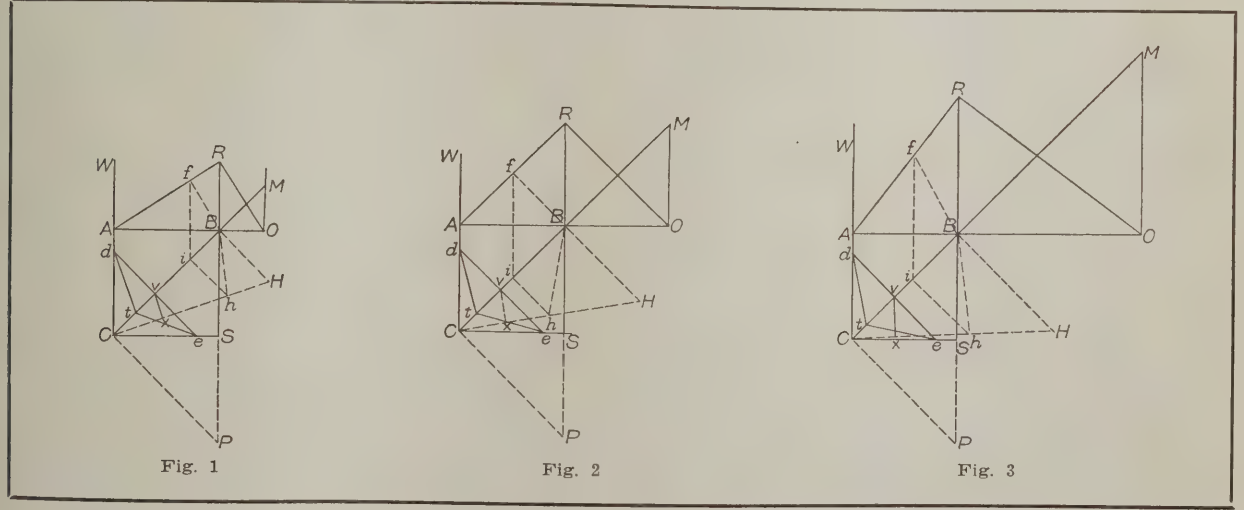


Fig. 1 Fig. 2 Fig. 3

Bevels for Rafters and Hoppers—Diagrams Showing Different Conditions That May Prevail

Draw lines *W A C* and *C S* to represent the sides of a plan of building or hopper at the corner to be constructed, as at *C;* which may be exactly 90 deg., or square, as in Figs. 1, 2 and 3; it may be greater than 90 deg., or obtuse, as Figs. 4, 5 and 6; or it may be less than 90 deg., or acute, as Figs. 7, 8 and 9.

Bisect the angle at *C* by the line *C B;* then the

*Superintendent of Construction, Q. M. Corps, U. S. A., Honolulu, T. H.

angle *B C A* is equal to the angle *B C S*. Draw *A B* at right angle to *W C*. This line can be drawn from any point on *W C;* but, as will be seen presently, it will be best to select a point on *W C* so that *A B* will be exactly 12 in. in length.

Draw *B R* at right angle to *A B* and make it equal to the rise of the roof. If *A B* is 12 in. in all the figures shown, then *B R* will be 8 in. for 1/3 pitch; 12 in. for 1/2 pitch; 16 in. for 2/3 pitch, and so on. Therefore, make *A B* exactly 12 in. and *B R* any length that may be selected to represent the rise of roof in 1 ft. of run; or the height of the side of hopper to be constructed.

Draw *A R*, which is the exact length of common and jack rafters for 1 ft. of run. Also, it is the pitch of roof, or the slope of side of hopper.

Draw *R O* at right angle to *A R*, and extend *A B* and accurately the length of each line in the diagram and mark it in plain figures thereon. Second, always remember that if a hip roof is inverted it will become a valley roof, and a valley roof is a hopper. Third, the various bevels required for a hip roof are exactly similar to those required for a valley roof and for a hopper. Here they are, all in a nutshell.

To frame common rafter take *A B* on the blade of the square and *B R* on the tongue; mark by the blade for level cut and by the tongue for the plumb cut. The level cut on hip jacks and the plumb cut on *all* jacks will be the same as for common rafter.

For bevel across edge of jack to fit against hip: Take *A R* on the blade and *A C* on the tongue; mark by blade.

To frame hip rafter (or valley), take *C B* on the

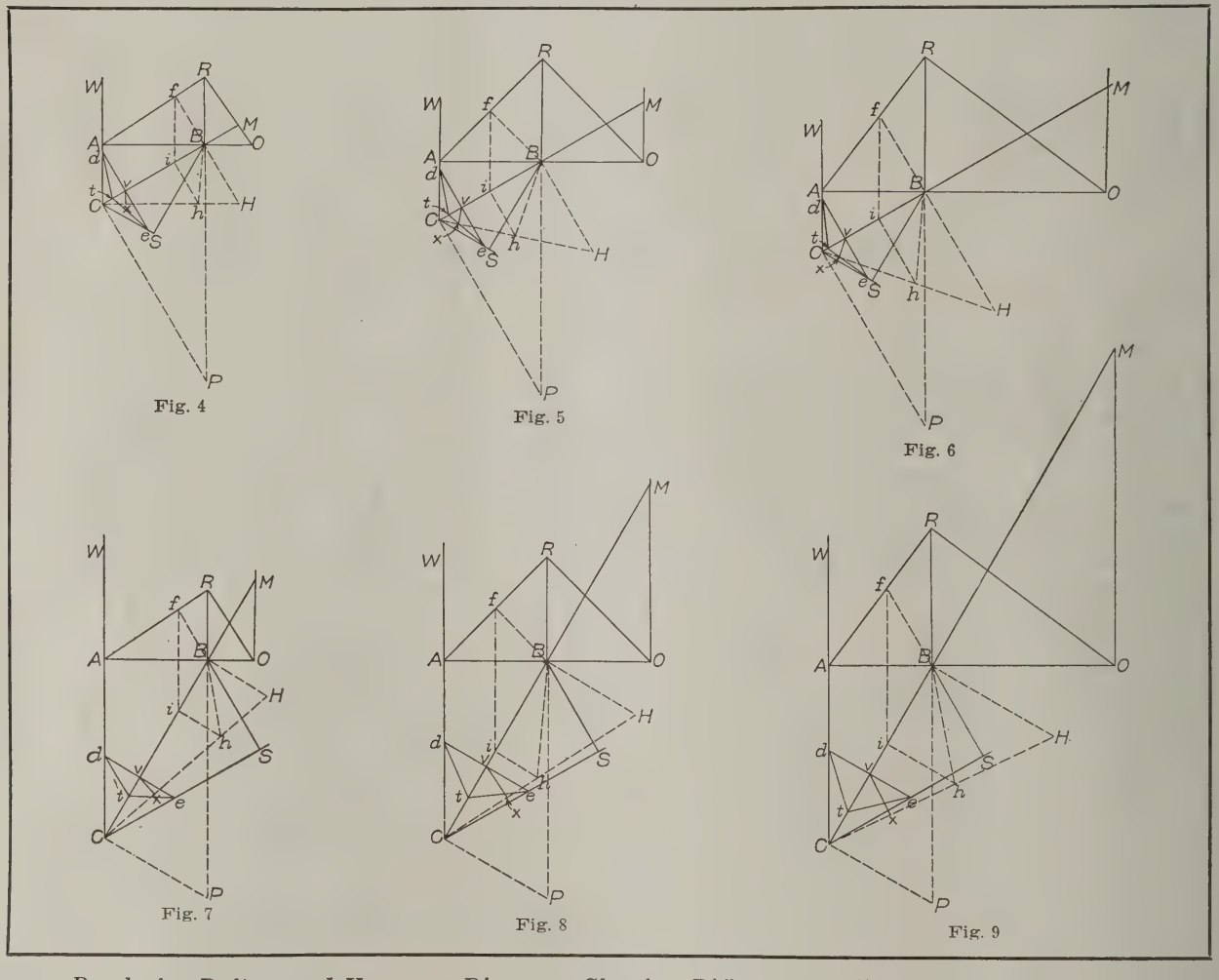


Fig. 4 Fig. 5 Fig. 6

Fig. 7 Fig. 8 Fig. 9

Bevels for Rafters and Hoppers—Diagrams Showing Different Conditions That May Prevail

to *O*. Draw *O M* at right angle to *B O*. Extend *C B* to meet *O M* at *M*. Make *C S* equal to *C A*, and draw *S B*. Now *A B* and *S B* represent the seats of first common rafters each side of the hip rafter shown by the line *C B*.

Draw *B H* at right angle to *C B* and make it equal to *B R;* draw *C H*, which will be the exact length of the hip rafter for 1 ft. of run of the common rafter.

Draw *C P* at right angle to *C B;* extend *R B* to *P;* then the line *R B P* will be parallel to the line *W A C*, and be an extension of the projected plan of the ridge board of the roof.

Use a good steel square and proceed to lay out the work as follows: First, measure very carefully

blade and *B H* on the tongue; mark by blade for level cut and by tongue for plumb cut. The distance between marks will be the length of hip for one foot of run of common rafter. To find the total length of hip rafter multiply the length just found by the number of feet in the entire run of the common rafter.

To find the bevel for hip to fit against side of ridge board, or to fit the "boot-jack" at top end of hip against the corner formed by the angle of ridge board, take *C H* on the blade and *C P* on tongue; mark by the blade. This same bevel will be required at bottom end of hip to receive the fascia nailed on ends of rafters; reversed "boot-jack."

To find the cut across face of hip rafter at the

overhang to receive the fascia board, draw *B f* so that the angle *B f R* will represent the angle cut on lower end, or overhang, of common rafter; draw *f i* parallel to *W A C;* draw *in* parallel *to B H;* draw *n B*. Then the angle *H n B* cut on lower end of hip will correspond with angle *R f B* cut on the lower end of common rafter.

In all of the foregoing the work has been laid out on the hip rafter with square edges. If it is desired to "back" the hip rafter proceed as follows: From any convenient point on *C H*, as at *x*, draw *x v* at right angle *C H;* through *v* draw *d e* at right angle to *C B*. Make *v t* equal to *v x;* draw *t d* and *t e*. Then the angle *d t e* will be the shape for back of hip. Set the bevel-square to angle *d t v* and apply it to the side of hip timber and cut off the corner to center line of hip. For a valley rafter, cut entirely across the thickness of timber and spike two pieces together, forming a true valley, or trough; *d t e* inverted.

To find bevel across face of roof board, take *A R* on the blade and *A C* on the tongue; mark by tongue. This is, also, the exact bevel required for a hopper.

To find bevel across edge of board, take *R O* on the blade and *O M* on the tongue; apply the square to edge of board and mark by tongue for a miter bevel; for hip or valley or hopper.

For a butt joint proceed as follows: Take *R O* on the blade and *A C* on the tongue; mark by tongue for bevel required. The long side will be the upper face of board at valley or for a hopper; while the short side will be the upper face of board at hip; or for a hopper when it is inverted; lapping over the other board.

If the dimensions for the diagram are greater than the figures on the square, then take one-half of those dimensions, as in Paragraph 19; that is, take one-half of *R O* on the blade and one-half of *A C* on tongue, and mark by tongue. The bevels should be marked on the edge of a straight board and transferred to the work by use of adjustable bevel squares, or by templates carefully made. In the case of short pieces used in hoppers it will be impossible to use the steel square applied directly to the material; but for rafters and long boards it will be convenient to do so.

The Sanitary Handling of Timber

Results of Some Investigations by the U. S. Department of Agriculture Relative to the Storage and Decay of Timber

ONE of the most important problems confronting the lumberman is the storage and marketing of his product in as sanitary a manner as possible, both to prevent direct loss to himself through deterioration and to protect the consumer against many avoidable outbreaks of rot after the timber is incorporated into buildings. The investigations of the United States Department of Agriculture during the past two years have revealed many deplorable conditions in the storage of timber and coincident with them have disclosed many serious outbreaks of rot in important structures. While many of the latter cases may be due to faulty construction, particularly to insufficient seasoning of the timber before used and to the failure to provide for sufficient ventilation in basements, the fact remains that infected timbers placed in buildings are far more likely to cause trouble than sound ones.

One Cause of Rot

Poor ventilation favors rot by not allowing the timber to come to an air-dry condition quickly enough to prevent the development of fungi.

Since decay is due to the presence of wood-rotting fungi the obvious first principle is to render conditions about the lumber yard unsuitable for the growth of the organisms. This can be accomplished by attention to the following details:

Wherever possible storage yards should be on high and dry grounds—on mineral soil rather than filled-in debris.

The most careful attention should be given to the cleaning up of the yards; also greater care should be taken in handling piling sticks and stacking lumber. Timber should never be allowed to lie, even temporarily, in close piles on the ground or on decayed tramways.

Pile Foundations

Very often pile foundations are altogether too low or are poorly constructed, not allowing sufficient ventilation beneath the stacks. Pile foundations should consist of timbers set on concrete or brick piers or blocked up at intervals with wood to a height of at least 18 in. from the ground. Such timber as enters into their construction should be either highly durable or else treated with some wood preservative.

Sound air-dry blocking cut from many of the low-grade species of timber having a good percentage of sapwood can be given a satisfactory treatment by heating in a tank at about 200 to 220 deg. Fahr. for 4 to 6 hr., then allowing to cool in the oil. The longer horizontal timbers can be given three coats of hot creosote at 180 to 200 deg. Fahr. at intervals of 24 hr.

According to the department, timber which shows any trace of decay should never be sold or accepted for building purposes, as even dormant fungi in dry timber can often start into active growth when placed under moist, comparatively warm conditions. Architects should see to it that only well-dried timber is employed and that beams and joists are never embedded in concrete or brick without allowing for ample ventilation at the ends by "boxing." Particular attention should also be paid to ventilating close basements.

A Small Country House of Five Rooms

A Frame Building with Exterior of Stucco on Metal Lath—Roof of Cypress Shingles

WE have taken for the subject of our colored supplemental plate this month a small house designed for a plot of ground having a frontage of 40 or 50 ft. The plan is compact and contains sufficient accommodations for a family of two adults and two children.

According to the specifications of the architect all foundation walls are to be of concrete 8 in. thick, supported on footings of concrete 10 in. thick and extending 6 in. each side of the walls above. All concrete is to be mixed in the proportions of one of cement to three of sand and five of broken stones.

The Framing Timbers

The framing timbers are to be of spruce with corner posts 4 x 6 in., girders 4 x 8 in., and plate 4 x 6 in. laid flat. The first tier of floor beams are to be 2 x 10 in., the second tier 2 x 8 in., all placed 16 in. on centers and strengthened with rows of 2 x 4-in. cross bridging placed 6 ft. apart. The studs are to be 2 x 4 in., placed 16 in. on centers and doubled at all openings. The rafters of the main roof are to be 2 x 8 in., and of the dormer roof 2 x 6 in., all placed 20 in. on centers. The porch girder is to be 2 x 8 in. and the porch floor beams 2 x 6 in.

The entire exterior frame of the building is to be covered with 1 x 9-in. hemlock sheathing laid diagonally, over which is to be placed a layer of good building paper. This in turn is to receive 1 x 2-in. furring strips placed 12 in. on centers, and to these strips is to be nailed the metal lath to which the stucco is to be applied.

The Exterior Stucco

The exterior stucco is to be two-coat work, the scratch coat to be at least ½-in. thick outside of the lath surface and to consist of one part cement, three parts sand and not more than 10 per cent lime putty. The first coat is to be applied under pressure and must be well scratched before it sets. The finish coat is to be ¼ in. thick and consist of one part cement, two parts sharp sand and three parts of pebbles for rough finish. The stucco is to be given a cream tint.

The roof is to be covered with red cedar or cypress shingles laid with an exposure of 5½ in. to the weather and with a heavy joint every third course. All shingles are to be dipped in shingle stain. The chimney, which takes care of the furnace, the kitchen range and the open fireplace in the living room, is to be of brick, and have three flues lined with vitrified flue lining. Above the roof line the chimney is to be finished with stucco.

The exterior cornice, rails, brackets, trim, etc., are to be of white pine.

The floors are to be double on the first tier of beams, the under-floor to be 1 x 6-in. tongued and grooved pine, while the finish floor is to be of ⅞ x 2½-in. comb-grain North Carolina pine in the living and dining rooms. All other rooms are to have ⅞ x 4-in. North Carolina pine floors.

Interior trim throughout the house is to be cypress for the living room, the dining room and the hall, and white wood for the bed rooms. All doors are to be of cypress.

The Layout of Rooms

An examination of the floor plans on the facing page shows the entrance to be through a vestibule containing a coat closet, the vestibule connecting directly with the living room. The latter contains a large stone fireplace with seat and bookcase, and from this room rise the stairs to the second story. The dining room opens directly into the living room, but may be shut off from it if desired by means of a screen.

The kitchen is of good size and contains sink, range, hot water boiler, wash trays, closet, stairway connection to the second floor and the flight leading to the cellar. Communication with the dining room is established through a large pantry which contains closets and space for refrigerator.

A cellar extends under the entire building and contains furnace room with considerable space for storage purposes.

The sleeping rooms on the second floor are well lighted and ventilated, the latter being greatly facilitated by reason of transoms over all doors. The bed room ceiling heights are 8 ft., the head room at the lowest point being 6 ft.

Between the two bed rooms and directly over the kitchen is located the bath room, its position being such as to require only one line of plumbing. The bath room is equipped with wash basin, shower bath and water closet.

The Trim

The trim in the hall, the living room and the dining room is to be brought to a smooth finish, filled with a good wood filler and stained and varnished, the colors to be selected by the owner. All trim in the bed rooms is to be enameled and the doors left natural. The side walls of the bath room are to be enameled and the ceiling left white.

The floors are to be brought to a smooth finish, filled and varnished, the first floor to have an additional coat of wax.

The exterior trim is to be painted three coats of white lead and linseed oil, well puttying the first coat.

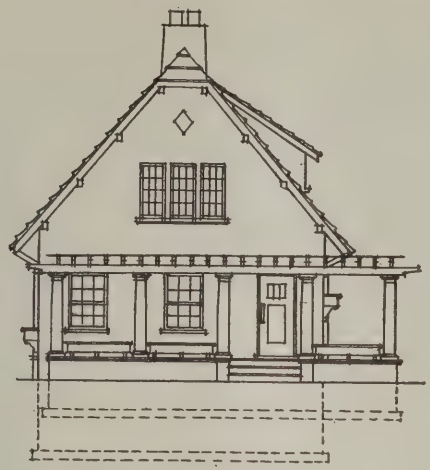
All sheet metal work is to be painted on both sides before it is laid, and all leaders are to be of galvanized iron of a square neat design.

A good system of plumbing is to be installed with simple fixtures, using a galvanized iron sink, a two-

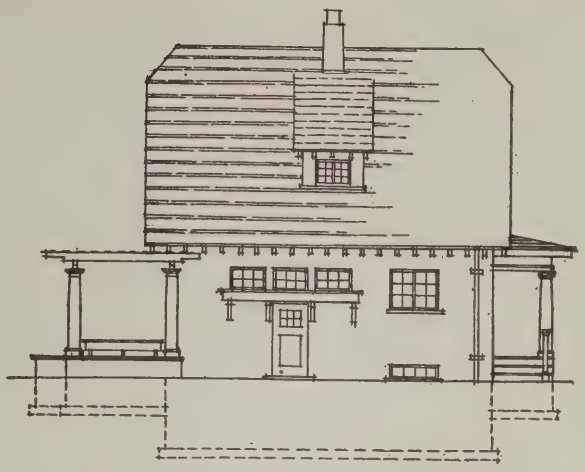


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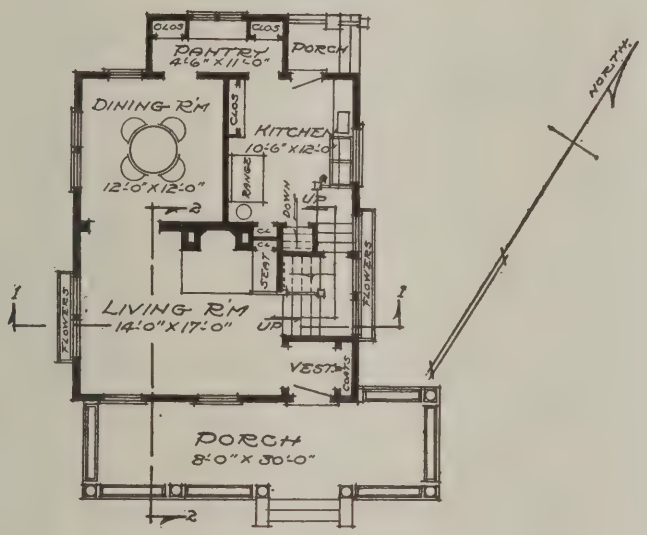
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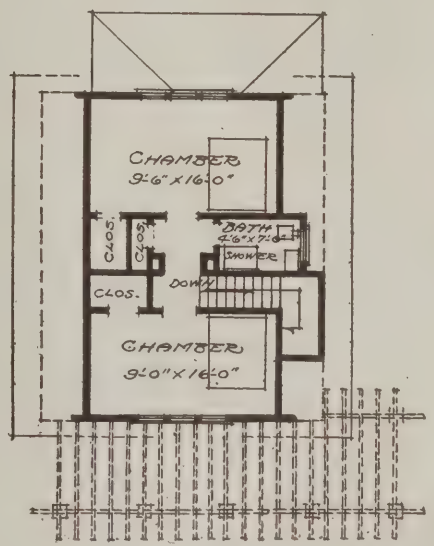
SOUTH ELEVATION



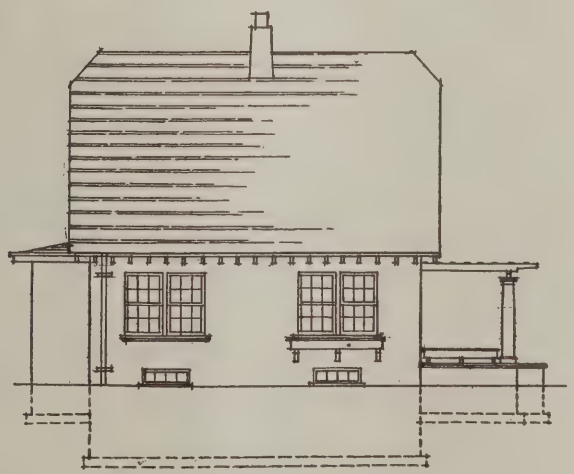
EAST ELEVATION



FIRST FLOOR PLAN



SECOND FLOOR PLAN



WEST ELEVATION

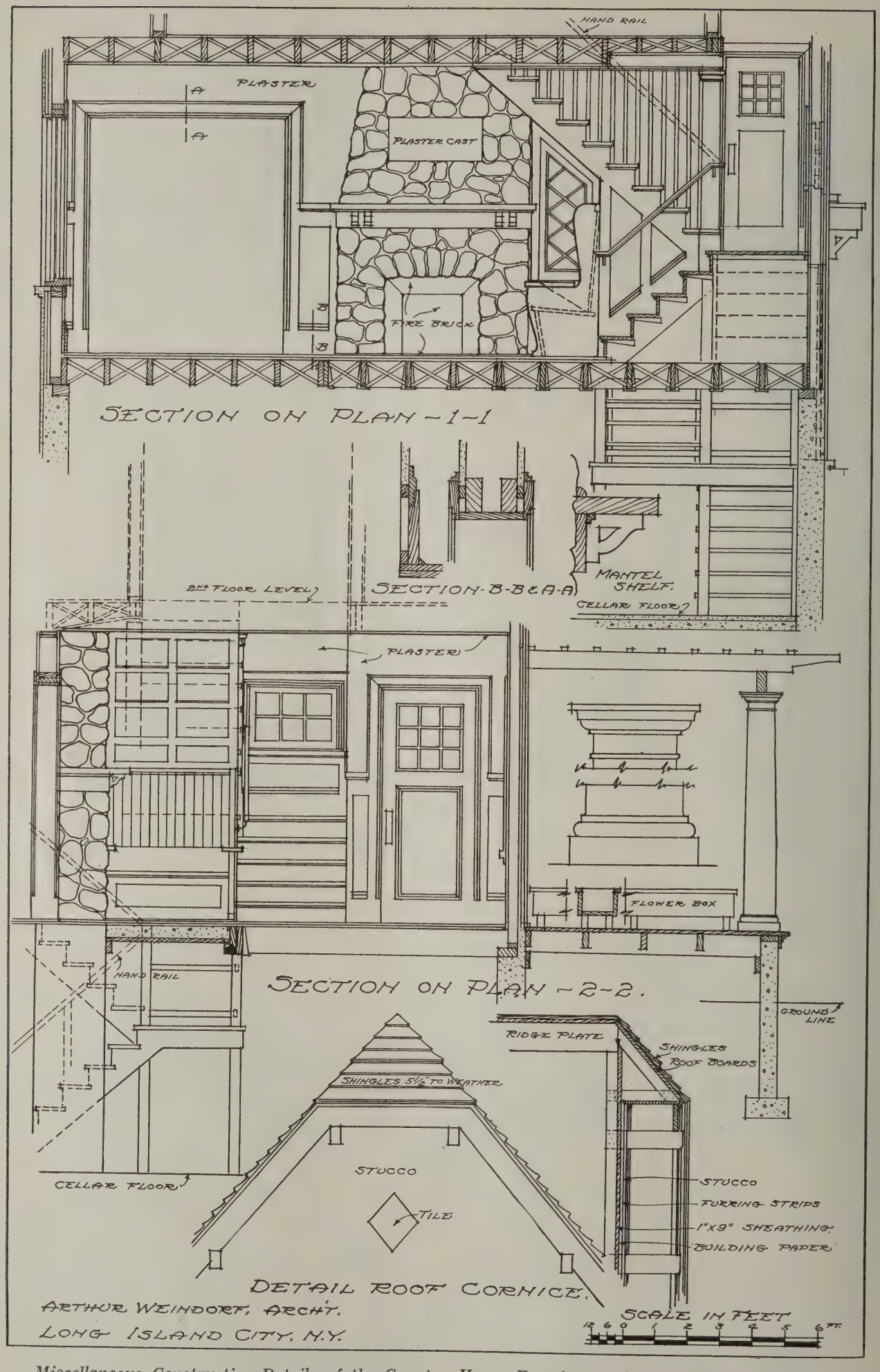


NORTH ELEVATION

ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N.Y.

SCALE IN FEET
0 4 8 12 16 20 24

Plans and Elevations of the Small Country House Forming Basis of the Supplemental Plate.



Miscellaneous Constructive Details of the Country House Forming Basis of Supplemental Plate

part wash tray of soapstone or enameled iron, and a 40-gal. galvanized iron boiler over the range. All the plumbing is to be exposed and all rough pipes to be painted with enameled paint.

The plumbing in the bath room is to be of the open type with a complete shower arrangement, the water closet to have china bowl and a low tank, and the washstand to have marble top and china bowl. All exposed pipes are to have a nickel-plated finish.

The hardware is to be of a bronze plate finish and match the lighting fixtures and hot-air registers.

The lighting is to be by means of electricity and gas. The living room is to have two drop pendants of two lights each and the dining room one drop pendant of two lights each.

The house is to be heated by hot-air system with registers in all rooms except the kitchen, the installation to be such as to properly heat the building in zero weather.

The architect computes the cubical content of the house here shown as 20,796 cu. ft. and places the unit cost at 16 cents per cubic foot.

The total figures of cost are to include the contractors' 10-per cent profit.

This small country house of five rooms has been designed by Arthur Weindrof, architect, Long Island City, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Fruit Storage House for the Farm

A Few Details of Construction Which the Country Builder Will Appreciate—Total Cost $500

BY JOHN L. SHAWVER

IT is possible that some of the readers of THE BUILDING AGE may be interested in a small storage house for the farmer who grows a few hundred bushels of apples a season. In most cases farmers depend solely on small cellars for the storage of apples, and if they grow a hundred or five hundred bushels of the finest of winter apples they are compelled to put them on the market before it becomes dangerously cold—that is, he places them on a market flooded with fall apples or he must store them in some warehouse more or less distant from the farm on which they grew.

The storage house here illustrated was erected on the farm of the writer in 1915. This farm has an orchard of about twelve acres, and though only a small portion of it is bearing, the question of suitable storage was becoming important. As the nearest cold storage warehouse was 28 miles distant, it was expensive to transport thereto and to pay rental for five to eight months. This building has solved the problem in a very satisfactory manner.

The foundation walls are of concrete and those of the superstructure are made snug and tight by means of 6-in. flooring, over which is placed a heavy layer of building paper, and this, in turn, covered with novelty siding. The doors are double and the sash double glazed.

The structure is 24 x 40 ft. in plan and two

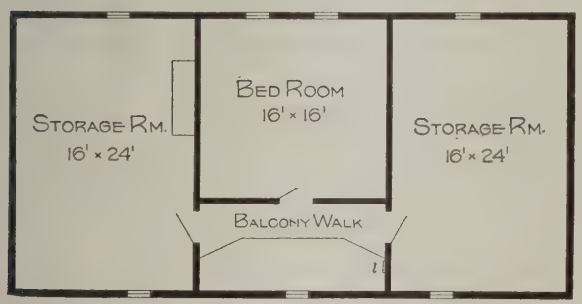


Fig. 2—Plan of Second Floor

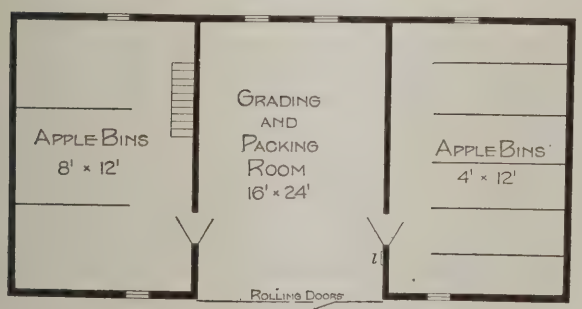


Fig. 1—Plan of Main Floor



Fig. 4—Dividing Panel—Scale ¼ In. to the Foot



Fig. 5—Elevation of Foot Brace

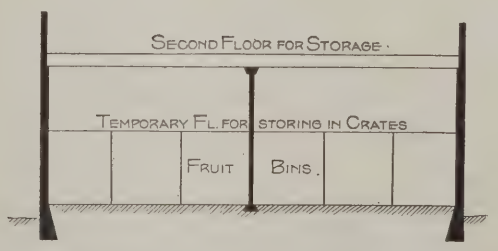


Fig. 3—Cross-Section of the Building Showing Arrangement of the Bins

Fruit Storage House for the Farm—Various Details of Arrangement

stories and attic in height. There are two cold storage rooms, each measuring 16 x 24 ft., as shown on the plan, Fig. 1. One is divided into small bins to accommodate different varieties, each bin holding about 150 bushels. These may be subdivided by means of portable panels 4 ft. long and 50 in. high, the panels being kept in position by foot braces, which may be placed at any point desired.

Details of the panels and braces are given in Figs. 4 and 5. If the bin has been made for, say, 80 bushels, and it is found that the variety is overrunning the estimate, the bin can be increased to a capacity of 90 or 100 bushels, as the case may be, by the use of the dividing panels and braces.

The other cold storage room is intended for standard varieties of winter apples such as Baldwin or Greening, which may yield several hundred or a thousand bushels. After these bins are filled, a temporary floor may be quickly laid over the partitions, as indicated in the sectional drawing, Fig. 3. The remaining space is then filled with apples in crates.

The middle room, as shown in Fig. 1, is intended for grading and packing, but may also be used for storing early winter or late autumn varieties. For the present it is used for storing the power spray trucks and the cider mill.

Layout of Second Floor

Fig. 2 shows the arrangement of the second floor, where two large storage rooms are provided for boxes, crates and barrels. Between the storage rooms is a bedroom, 16 ft. square, which is of sufficient size for two beds, a table and chairs to meet the requirements of extra help at picking time. This room may be reached by means of a stairway or by a ladder attached to the wall near the outside entrance. A balcony walk connects the two storage rooms and passes in front of the bedroom. The open space in front of the balcony is for convenience in unloading boxes, crates, etc., into the storage rooms. The attic is used for ladders and lumber.

Five ventilators are provided at each end of the building. With the outside temperature ranging from 10 deg. below zero to 70 deg. above, the temperature in the fruit rooms may be kept at 30 deg. or 40 deg. without much difficulty. About 2 in. of straw is placed on the clay floor and this has provided such ideal protection that Maiden Blush, Wealthy and Munson Sweet were kept in fine condition to January. If zero weather should be likely to continue for several days a small coal oil stove is sufficient to maintain the necessary 30 deg. in these storerooms.

Provision is made for the use of ice in warm weather by means of a shallow pan of galvanized iron, 20 x 60 in. in size, placed on the temporary floor. On this pan from one to four cakes of ice may be placed, according to requirements.

The entire cost of this building, including labor and first-class materials, was $500, this also covering two coats of paint and lightning rods.

Probably the queerest town on earth is Universal City, Cal., for it is a make-believe city with a population of 1500, all employed in the art of making moving pictures.

San Francisco Building Material Market

Our correspondent, writing under date of April 1, says: "The general building market has improved greatly since the end of the heavy rains, and in San Francisco and many neighboring towns there is more activity in new construction than for nearly two years past. This is in spite of the postponement of a great volume of work on account of the excessive cost of many materials. Figures were recently taken for the construction of an addition to a local hospital, the bids running considerably below half a million dollars, but the lowest was $100,000 in excess of the estimate based on costs last year, and the job was held up. This is only one example of many that might be cited.

"Structural steel fabricators have raised their prices quite sharply, but not so much as might be warranted in view of the cost of the raw material, which costs about 4 cents per lb. out of stock. Rather large shipments, however, are coming in on old contracts, and construction is proceeding much more rapidly. It looks as if this would be rather a good year for concrete, for, though bars cost nearly as much as shapes, considerable economy can be effected in the tonnage used, and prices for rock, sand and cement have not changed much. In fact, contracts have already been let for considerable important concrete work.

"The cost of galvanized sheets has come to be practically prohibitive for building, and other materials are being substituted. More lumber is being used for barns and warehouses, which will in some cases be protected by asbestos or composition; and for roofing the patent compositions, asphalt and gravel, etc., are largely replacing corrugated sheets. Metal cornice work is also materially curtailed. Such cornices, because of cheapness, as well as immunity to earthquake damage, have been very popular in San Francisco. Now there is a tendency to use more terra cotta cornices or to change the designs, reducing cornice work to a minimum.

Sale of the "Tower of Jewels"

The "Tower of Jewels," which was one of the show pieces of architecture at the Panama-Pacific Exposition in California, has been purchased by a firm of pipe dealers, the members of which are considering the means of its disposal. The high prices of steel and lumber give big value to the materials that were used in the spire. It is said that in the tower are 2,000,000 ft. of No. 1 pine lumber, which would be marketable at a good figure. In addition the tower contains 2000 tons of structural steel.

The Tower of Jewels stands 433 ft. above the ground upon a solid concrete base with a surface of 300 sq. ft., and is said to have cost $200,000.

Utilization of Exposition Materials

The big logs from the Oregon Building at the recent Panama-Pacific Exposition, which excited much admiration, are being used in Berkeley, Cal., to construct a home for R. W. Hawley.

Timbers from the Pennsylvania Building at the Exposition will form most of the framing material for a large apartment house in Oakland.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

FOR irregular and unsymmetrical loading find the reactions as for a simple beam similarly loaded with concentrated loads, and the panel joint where the maximum moment occurs is the point of zero shear. From this point the loads run up and down the web members to the ends, instead of from the center panel, as in the case of uniform and symmetrical loading. For unsymmetrically loaded trusses the weight per panel is used instead of the proportion of weight (coefficient).

A truss being merely a skeleton beam a study of the manner in which the loads go to the abutments shows that the weight on each panel is really the shear on the panel. It is thus feasible and practical to consider the truss as a beam, and from the reaction at either end subtract in succession the loads on the panel joints until the point of zero

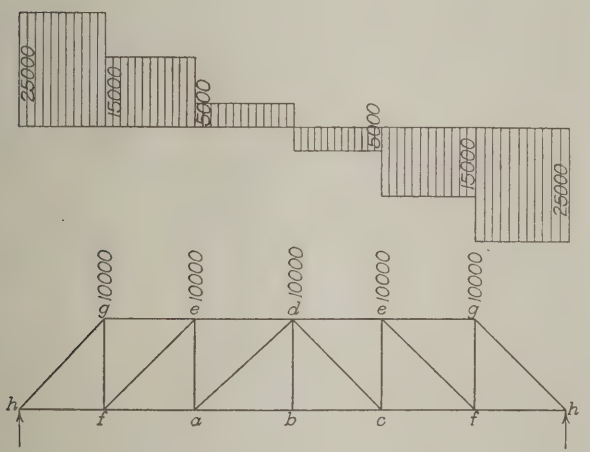


Fig. 63—Shear Method for Obtaining Stresses in Truss

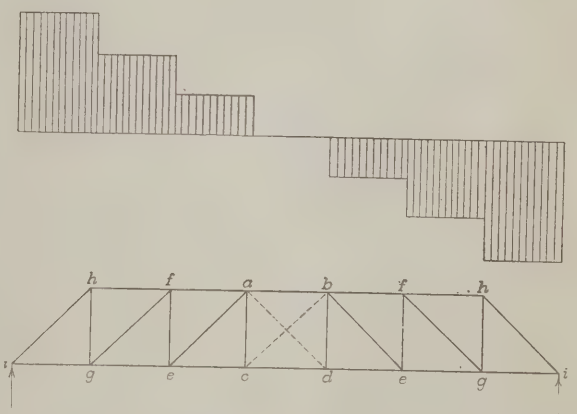


Fig. 64—Shear Method for Truss with Odd Number of Panels

shear is reached. In Fig. 63 is shown a truss with the shear diagram. The shear on $gh = 25{,}000$ lb.; on $ef = 15{,}000$ lb.; on $cd = 5000$ lb., the panel load being 10,000 lb. concentrated at the joints. The skeleton truss lies on the center lines of the members, the panel length being 10 ft. and the height 10 ft. The length of a diagonal = 14.14 ft., so the

$$\text{compression in } gh = \frac{14.14 \times 25{,}000}{10} = 35{,}950 \text{ lb.}$$

$$\text{The compression in } ef = \frac{14.14 \times 15{,}000}{10} = 21{,}750 \text{ lb.}$$

$$\text{The compression in } dc = \frac{14.14 \times 5000}{10} = 7190 \text{ lb.}$$

With the load considered as applied on the upper chord the tension in $gf = 15{,}000$ lb.; the tension in $ec = 5000$ lb., and the tension in $bd = 0$. With the load considered as applied on the lower chord the tension in $gf = 25{,}000$ lb.; the tension in $ec = 15{,}000$ lb., and the tension in $bd = 5000$ lb.

The compression and tension per panel in the chords $= \frac{Wl}{d}$, therefore compression in $eg =$ tension in $fh = 25{,}000$ lb., for the ratio $\frac{l}{d} = \frac{10}{10} = 1$. The compression in $de =$ tension in $cf = 25{,}000 + 15{,}000 = 40{,}000$ lb. The tension in $bc = 25{,}000 + 15{,}000 + 5000 = 45{,}000$ lb.

The object of the computations being to obtain the stresses so members may be proportioned the method above given of following the loads from joint to joint and obtaining the co-efficients for uniformly and symmetrically loaded beams, or of obtaining the shear at panel joints for unsymmetrically loaded beams is adequate and simple.

It can be proven that a truss is merely a skeleton beam by finding the shear and bending moment at each joint and then dividing the bending moment by the depth obtain the stresses in the chords, the web members carrying the shear. In Fig. 63 the end reactions each equal 25,000 lb. Then M, at f, $= 10 \times 25{,}000 = 250{,}000$ ft.-lb.

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 63 of the April issue.

M, at g, = 0, for the top chord rests on gh.

M, at c, = (20 × 25,000) — (10 × 10,000) = 40,000 ft.-lb.

M, at e, = 10 × 25,000 = 250,000 ft.-lb.

M, at b, = (30 × 25,000) — (10 × 10,000 + 20 × 10,000) = 450,000 ft.-lb.

M, at d, = (20 × 25,000)—(10 × 10,000 = 400,000 ft.-lb.

Dividing the moments by the depth:

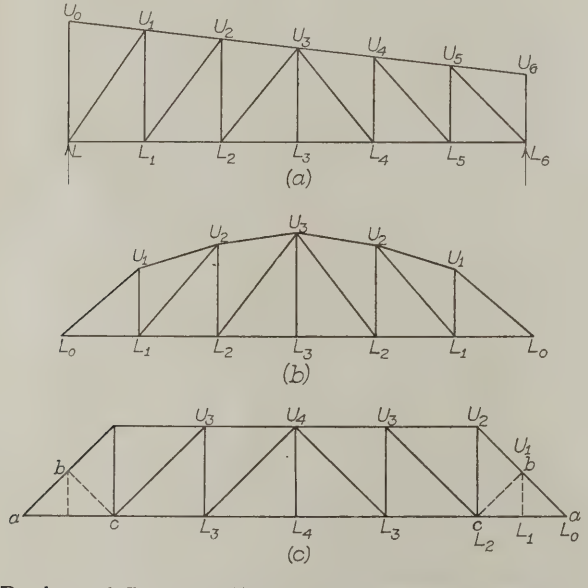
Tension in fh = compression in eg = $\frac{250,000}{10}$ = 25,000 lbs.

Tension in cf = compression in de = $\frac{400,000}{10}$ = 40,000 lb.

Tension in bc = $\frac{450,000}{10}$ = 45,000 lb.

Fig 64 shows a truss having an odd number of panels. There is no stress in the dotted cross diagonals in the middle panel except in case of wind or rolling loads, or otherwise unbalanced loading. Coefficients may readily be written for uniform and symmetrical loadings for this case, or the loads may be followed from the point of zero shear in cases of unsymmetrical loading, or the shear method may be followed.

In Fig. 65 (*c*) is shown a truss with a sub-vertical and sub-diagonal at each end. Such an arrangement involves the consideration of an additional triangle in which half the weight is added to the load at *b* and is then carried to *a*, the other half being added to the load at *c*. This arrangement offers no difficulty when figured by the shear method but sometimes causes trouble and confusion when an attempt is made to trace out the loads from the middle panel, or point of zero shear.



Design of Beams, Girders and Trusses—Fig. 65—(a) Truss with Non-parallel Chords; (b) A Bow Girder; (c) Truss with Sub-verticals

Some trusses have non-parallel chords. The shapes vary from those higher at one end, as in Fig. 65 (*a*) to those approaching an arch form as at Fig. 65 (*b*). Part of the shear is carried by the sloping chord. When the chord stress is found by one of the preceding methods it is the horizontal stress. For a sloping chord the horizontal stress must be multiplied by the inclined length and the product divided by the panel length, the result being the axial (longitudinal) stress in the inclined member.

(To be continued)

Is a Fruit Stall a "Building"?

A case recently came up in England where a man was summoned before the authorities "for not depositing plans; also for not giving notice to erect and for the use of improper materials." The borough engineer stated that the building was a light structure supported on iron standards, fixed into a concrete floor, which supported battens, on which were laid others, and over all was placed a tarpaulin. It had a complete front of wood, with movable shutters, dividing walls on either side formed the sides, and the building was braced to one of the walls so that it should not blow down in a storm."

Plans of a temporary building in a form which the council would approve had been deposited, but the work had not been proceeded with. The defendant stated that the structure was so fragile that the whole of it could be taken down in five minutes and re-erected in a similar time. He sold fruit at the stall, and was in the habit of taking it down every Sunday and cleaning the place. The walls were there before, and all that he had added were the uprights (which were placed in sockets in the concrete) and the rafters on which the tarpaulin rested.

Counsel for both plaintiff and defendant agreed that there was no legal definition of a building and the court came to the conclusion that within the meaning of the Public Health Act this was a building and agreed to state a case.

A Hillside Dwelling Scheme

Construction is about to begin on a fireproof community residence scheme on a large lot at Green and Taylor streets, San Francisco, on the steep slope of Russian Hill. The structure will consist of sixteen residences of 5 to 12 rooms each, so arranged as to give each a good share of the marine view. Each will have its individual entrance, approached by broken flights of steps, which will be varied by terraces and pathways through gardens. An electric tram elevator will also be built through the central court. Every room, it is said, will be an outside one, and all residences will be provided with either roof gardens or balconies.

The general architecture shows influence of the Pueblo style, which is well adapted to the hillside location. The main entrance will be through a lobby, the walls and ceiling of which will be of caen stone, floors and stairways of marble and doors, etc., of bronze. Ten individual garages will be a part of the structure. The property will be owned by a corporation, the plan being to have the stockholders own the various homes in the group.

Mortars for Brick and Stone Masonry

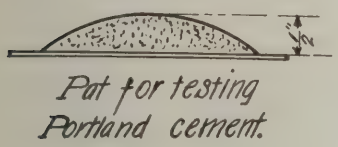
Brief Reference to the Chief Characteristics of the Ingredients Entering into Their Composition

By W. H. Hefelfinger



MORTAR for any kind of masonry is composed of sand, some cementing material and water, but the proportions of these materials and kind of cementing material to use depend on the kind, quality and purpose of the masonry. A thorough knowledge of the materials used in making mortar should first be acquired if one wants to make mortar durable and at the same time economical. The principal cementing materials used are Portland cement and lime. There are several special cements used in pointing stone, which I will describe later.

Portland cements are nearly all identical in chemical analysis and will meet the required specifications of the "American Society for Testing Materials," so one is safe in using any well-known brand of Portland cement for making mortar, as long as it is in good condition and is not too old. If you care to test the cement, however, the most practical way is to make a pat of neat cement according to Fig. 1, keeping it in a moist place for twenty-four hours, then boil it for three hours. If it shows no signs of disintegration, it is all right. This is a very reliable test.



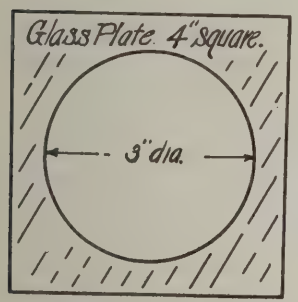


Fig. 1—Glass Plate for Testing Cement — One-half Full Size

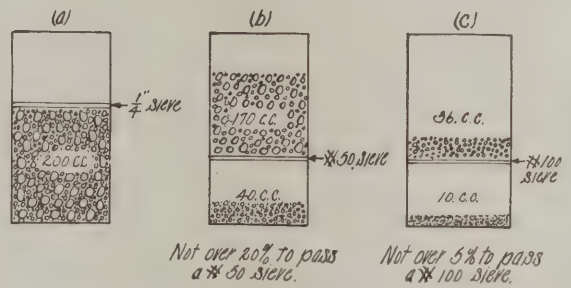


Fig. 2—Diagrams Showing How Sand Grains Should be Graded

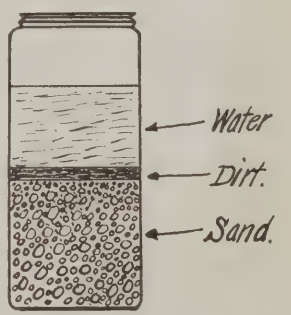


Fig. 3—Testing Sand for Cleanliness. Sand Should Be Washed if it Contains Over 3% of Clay, Loam or Vegetable Matter

Mortar for Brick and Stone Masonry

Lime differs from cement in that it is a natural product, while Portland cement is an artificial one. We have to take lime as it comes, its quality depending upon the purity of the limestone from which it is made. Lime is made by calcining limestone, which is mainly calcium carbonate and magnesium carbonate, the latter being classed as an impurity. Some limes contain as much as 35 per cent magnesium carbonate, which, of course, makes it a poor lime. These impurities in lime do not have any chemical action on the mortar, but simply act as adulterants like water does in milk; it simply takes so much more to get the same results. Since commercial limes in different parts of the country vary from 65 per cent to 97 per cent pure, you can readily see why it is necessary to have different mixtures for different limes. Good lime should possess the following characteristics:

1. Freedom from clinkers and cinders and with only a small percentage of other impurities.
2. It should be in large lumps, free from dust.
3. It should slake very readily in water, forming a very fine, smooth paste without residue.
4. It should dissolve in soft water.
5. It should increase from 2½ to 3 times in bulk.

Poor limes may be used for mortar for brick and stone work, but they should not be used in plastering. Lime should never be kept in a damp place as it absorbs moisture from the air and soon becomes useless as a building material. For best results lime should be slaked as soon as possible after it is burned. Slaked lime will keep indefinitely if kept moist. Hot mortar drys out very quickly and shrinks considerably, causing cracks in the mortar joint. It is far better to let it cool for at least twenty-four hours before using, and there is no reason why this should cost more or take more time if the work is planned ahead.

Hydrated lime, a specially slaked quicklime, is used very extensively in the United States for plastering and masonry, especially in cement lime mortar. This lime keeps well, is easy to handle and makes good strong mortar.

Sand is used in cement mortar to cheapen it and

prevent shrinkage. In lime mortar it adds strength in proportions up to three of sand to one of lime. After that, any increase of sand weakens it. Sand is an aggregation of loose, incoherent grains of crystalline structure, derived from the disintegration of rocks. It is obtained from the seashore, from beds and banks of rivers and from land deposits. Sea sand is not very desirable because the alkaline salts attract and retain moisture, which acts on certain soluble substances in the lime and brick, causing them to appear on the surface in form of white powder, commonly called whitewash, and is very noticeable on red brick work. River sand is generally composed of rounded grains and is very likely to contain clay and other impurities in form of vegetable matter, which may, however, be washed out. Pit or bank sand grains are usually angular in form and of good size, but contain considerable clay and loam, which should always be washed out before using in the best work. Marble dust, which is obtained from marble yards, is often used in laying stock brick where fine joints are necessary. Stone screenings are used in making mortar where a heavy joint is used and is obtained by screening the fine stuff from crushed rock for concrete work.

Recent Tests and Experiments

Recent tests and experiments have proven the following facts in regard to sand:

1. Sharp grains are not necessary.
2. The quality of sand is governed by the graduation of size of grains from coarse to fine.
3. Loam and clay are not always injurious; that is, a small amount of clay with coarse sand would be beneficial, especially in a poor mixture, but in fine sand would be injurious, particularly in a rich mixture.
4. Clay and loam are injurious to rich mixtures.
5. Dry sand is heavier than wet sand.
6. Coarse sand and cement make a denser mixture than fine sand and also require less water.
7. Coarse sand is heavier than fine sand with ordinary amount of moisture.
8. A sand in which the grains are graded from coarse to fine, with coarse predominating, makes the densest and strongest mortar.

When good sand is required, specifications should read as follows: Sand should be composed of grains that are hard, of crystalline structure, free from clay, loam, vegetable matter and salt. It should consist of a mixture of coarse and fine grains with the coarse grains predominating; not more than 20 per cent should pass a No. 50 sieve and not over 5 per cent a No. 100 sieve.

Fig. 2 illustrates how sand should be graded: "a" shows 200 cubic centimeters of sand that has passed ¼-in. sieve; "b" shows the amount passed a No. 50 sieve and amount retained; "c" shows the amount that passed a No. 100 sieve and the amount retained. You will notice a slight difference in total amounts when measured separately and when measured together. That is because some of the finer grains fill the voids in the larger grains.

A simple method to test sand for cleanliness is to take a fruit jar, put about 4 in. of sand in it, fill with water, shake thoroughly and let settle till the water is clear, then you will find sand in the bottom of the jar and a layer of clay, loam and vegetable matter on top of the sand. By measuring the thickness of this layer, you can compute the percentage of dirt in the sand. Fig. 3 illustrates the test.

The fact that a small amount of clay or loam is beneficial to coarse sand in poor mixtures is especially valuable to bricklayers, because coarse, clean sand works very hard and a small amount of clay or loam added would make it work much easier, especially in cement mortar. The extra number of bricks a bricklayer would lay in a day would more than compensate for additional cost in making mortar, but I should not advise using more than from 10 per cent to 15 per cent of clay or loam. The water used should always be clean and free from all acids, alkalies and oils.

(*To be continued*)

A Mammoth Building Operation

One of the far-reaching effects in this country of the European war is the new industrial plants and extensions to old ones which have been erected or are now in progress, especially in the New England States. An example in point is the mammoth small arms and ammunition plant of the Remington Arms and Union Metallic Cartridge Companies at Bridgeport, Conn. Constituting this new plant are thirty-eight buildings, and of the main units there are thirteen. They are five-story brick and steel buildings 272 ft. long x 60 ft. wide, and instead of standing separately or being connected only by corridors or extensions, they are connected with each other by five-story structures called "service buildings," each of which is 80 ft. long x 48 ft. wide, so that the entire mass forms practically one gigantic structure. At the end is a single-story building 272 x 94 ft., connected on the ground floor to the main units by a "service building" 80 ft. x 48 ft. in plan.

In order to provide housing accommodations for the 34,000 employees and their families the company is erecting hundreds of houses, some of which are for two families, some for six families, and some are what may be termed apartment buildings. No two of the houses are alike, although all the houses of each kind have the same floor space. The company desired to avoid all appearance of a "community town," and there are architectural differences which set each house a little apart from the others in its exterior aspects. The two family houses provide living room, dining room, kitchen, three bedrooms and a bath room for each family.

This operation has made such a revolution in Bridgeport that the company has been obliged to practically build another city within the city for the accommodation of the thousands of men who are coming from all parts of New England to form a new colony.

Many of our readers will be interested in learning that Ernest McCullough, whose articles on construction work which have been appearing from time to time in the columns of THE BUILDING AGE, has been appointed chief engineer of the fireproof construction bureau of the Association of American Portland Cement Manufacturers, with western headquarters in Chicago, Ill.

The Bungalow Home of a Californian

A Well Considered Floor Plan Arrangement with an Exterior Fully as Attractive as the Interior

AN excellent example of the California type of that cozy-cottage form of domicile generally designated as a bungalow is illustrated upon this and the following pages. The exterior architectural treatment is such as to give a most imposing effect, while the interior embodies an arrangement which will invite careful study on the part of interested readers. The foundations are of concrete; the exterior walls are sheathed and papered and are then covered with Redwood shakes laid 14 in. to the weather. The porch timbers, pergola beams, barge boards, etc., are such as to give to the house an impressive appearance and at the same time maintain a harmony of outline. The shakes are stained and the exterior trim is of surfaced Redwood treated with three coats of paint.



The Bungalow Home of a Californian—Designed by Henry L. Wilson, Los Angeles, Cal.

The front porch pergola walls and buttresses as well as the exterior of the chimneys are built up of dark red tapestry brick laid in black cement mortar with deep raked joints and finished with brick caps on the porch work and smooth cement caps at the chimneys. The porch and pergola floor as well as the steps and the basement floor are of concrete with cement finish.

The floor joists are 2 x 10 in., the ceiling beams 4 x 4 in. and the rafters and studs are 2 x 4 in.

The arrangement of the rooms is unusually attractive, there being a living room, dining room, den, breakfast room, kitchen, maid's room, sleeping room and bath, so disposed as to admirably meet the requirements of the owner. The living room which is 14 x 22 ft. in size, together with the dining room, 14 x 16 ft. in area, and the den 11 x 12 ft., are finished in quarter sawed oak, while all other rooms with the exception of the maid's room are trimmed in Oregon pine finished in old ivory enamel. The living room and den have oak floors and all other rooms have maple floors.

Rising from one corner of the living room is an open stairway facing which, on the opposite side of the room, is an open fireplace with tile mantel and flanked on either side with bookcases. At the front are large plate glass windows and at the rear are French doors opening onto the pergola. There are also French doors opening from the dining and the breakfast rooms to the pergola.

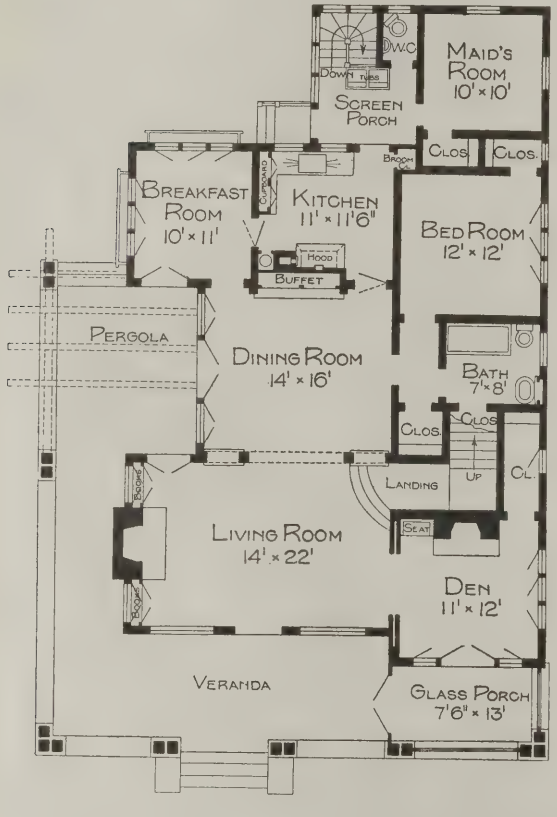
The dining room has a panel wainscoting, a wood cornice and oak floors the same as the living room and den. There is a large buffet with the mirror, 82 in. x 12 in. There are china closets above the counter shelf and drawers for silver below with cupboards with plate glass doors on either side for punch bowl and chafing dish.

The breakfast room, conveniently located as regards the kitchen, has oak floor and the woodwork is old ivory. There is a plate rail about 4 ft. 6 in.

from the floor with 3-in. battens placed over panels of Fab-Rik-O-Na of a delf blue and gold. The wall above the plate rail is covered with delf blue paper and the ceilings and walls above the picture molding are white.

The kitchen is fully equipped with cupboards, drawers, spice boxes, molding board, flour bins, broom closet, etc. There is a plaster hood built over the stove with a 4 x 8 in. vent pipe to carry the fumes of smoke from the kitchen. All of the woodwork as well as the hard wall plaster wainscot is finished in white enamel. The walls above the wainscot as well as the ceilings are painted in a washable paint of a very light color.

On the first floor is the guest's room finished in old ivory woodwork and having maple floors.



The Bungalow Home of a Californian—Floor Plan —Scale 1/16 In. to the Foot

The maid's room is finished in slash grain Oregon pine stained and varnished.

The den has an open fireplace of pressed brick with a good size coat closet at the right while at the left is a built-in seat. There are French doors opening into the glass enclosed porch at the front and which in a way forms an extension of the veranda.

On the second floor is one large room, 17 x 19 ft. in area with woodwork finished in old ivory and with floor of maple. There are French doors opening to the east and north. This room is provided with a large cedar-lined closet.

There is a bath room on the first floor and one on the second floor, both of which have tile wainscoting and tile floors. In the bath room on the second floor is a shower.

Contrary to general custom in connection with one-story dwellings in the section of country in which this was erected, there is a good sized basement under the rear portion of the house to accommodate the coal furnace by which the house is heated. Registers are placed in all the rooms.

The home here shown is located on the 400-acre ranch near Oxnard, Cal., of L. C. Ross, a prominent lima bean grower of that place and the drawings were prepared by Henry L. Wilson, 1129 W. P. Story Building, Los Angeles, Cal.

Test of Hollow Tile Floor

A very interesting test of hollow building tile, consisting of a floor slab 6 ft. wide and 30 ft. long continued over three piers 15 ft. apart, has recently been made by the United States Bureau of Standards, at Pittsburgh, Pa. The tile was of a special type for use in floor slabs and was made so that the bottom surface was about 2 in. wider than the top. In laying the tile in the form of a slab, the pieces touch on the bottom, but are about 2 in. apart at the top. This space continues throughout the length of the slab, and is filled with a mortar composed of one part cement and two sand, in which are placed several reinforcing rods bent up at the ends of the slab and continued through the concrete beam into the next adjacent hollow-tile slab.

In the present case the two slabs were allowed to age for one month. Tests were made of these, loaded uniformly with pig lead, numerous deflection readings being made as different loads were applied. One of the slabs failed at about 603 lb. per square foot. The other was able to withstand a slightly greater load, 690 lb. per square foot. Failure occurred in the mortar beams, due largely to the inferior grade of reinforcing used. One of the concrete supporting piers also failed near its base.

The College of Forestry at Syracuse, N. Y., has made announcement of a correspondence course in lumber and its uses, which is open to any person in the State of New York. This phase of its general educational work has been developed as a result of an increasing number of inquiries regarding the technical qualities of our various American woods. The inquiries have come from carpenters, contractors, cabinet makers, architects, lumbermen, craftsmen and woodworking establishments, and it is felt that this correspondence course will be helpful to those desirous of knowing more about wood and its technical qualities.

Among the building improvements in progress in Chattanooga, Tenn., is a twelve-story and basement reinforced-concrete office building for the Volunteer State Life Insurance Company and estimated to cost in the neighborhood of $400,000. The structure will cover an area 96 x 106 ft., and will have an exterior of light colored vitreous brick except for the first and second stories and the cornice, which will be terra cotta. The plans were drawn by Architects Varnell & Varnell, Chattanooga, Tenn.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

New Method of Determining Stresses in Web Members of a Fink Truss

From Harry B. Wrigley, Allentown, Pa.—In the graphical analysis of stresses in roof trusses of the form shown in Fig. 1, a difficulty is encountered at joint 5, supporting the load *C-D*; for after determining the stresses in the members meeting at joints 1, 2 and 3, there remain three unknown forces at joint 5, namely, in members *D-P*, *P-O* and *O-N*. A similar difficulty is met with at joint 4, where there are three unknown forces, namely, in members *N-O*, *O-R* and *R-K*.

It is a well-known fact that, in order to construct a polygon of forces in equilibrium, acting in the same plane, through the same point, at least all conditions but two must be known.

To illustrate the new method (the web members being treated without change or substitution), consider the left half of the truss, Fig. 1, as shown in Fig. 2, and lay off the load line *a-b-c-d-e-k*, and reactions *k-r'* and *r'-a*, in the usual manner; then construct the stress diagram for the web members as shown by the dotted lines in Fig. 3, taking the joints in numerical order.

Now, it is evident from Fig. 1 and Fig. 3 that the panel loads to the right of load *E-F* do not affect the web members to the left of this load; therefore, having determined the web stresses, complete the load line *a-j*, and reactions *j-k* and *k-a*, Fig. 3, to obtain the stresses in the chord members. The diagram *l-m-n-o-p-q-r* should be made identical with the dotted diagram *l'-m'-n'-o'-p'-q'-r'*.

Since the truss and its loading, Fig. 1, are symmetrical, one-half only has been considered in plotting the stress diagram.

The above method applies with equal facility to diagrams for wind load stresses.

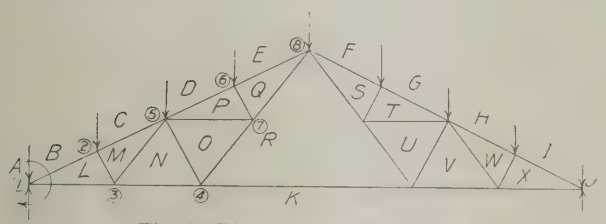


Fig. 1—Diagram of a Fink Truss

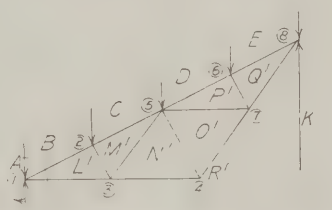


Fig. 2—Left half of truss shown in previous figure

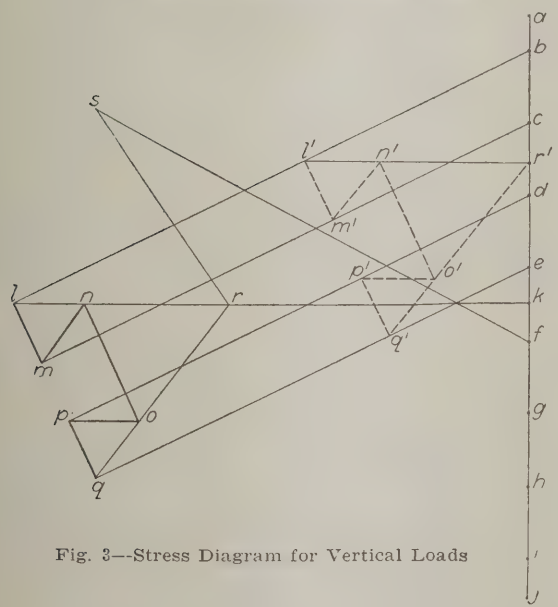


Fig. 3—Stress Diagram for Vertical Loads

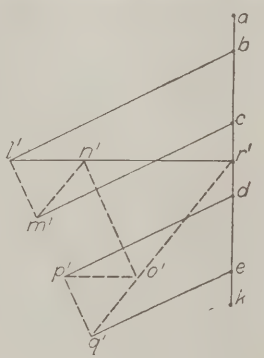


Fig. 4—Diagram for Web Members Only

New Method of Determining Stresses in Web Members of a Fink Truss

In the third paragraph the reader will notice, in brackets, the following words: "The web members being treated without change or substitution." This refers to all known methods in which *imaginary members* are substituted for the members *O-P* and *P-Q*. My method is original and no doubt will be of interest to contracting builders, architects and engineers generally.

Criticism Wanted of Plans and Elevation

From Ten-Room Twin House, N. J.—I am submitting plans and front elevation of a house which I would like to have reproduced in the Correspondence Department of the paper and the readers offer criticism and suggestions as to improvements which might be made. For example, the windows above the two outside doors are not needed, but in order to avoid the large blank space what treatment can be substituted?

It is proposed to construct rear and party walls of monolithic concrete, the front wall to be either of hollow concrete blocks, made face up, with a sand finish, or built of hollow tile. The foundation above grade to the top of the cellar windows is to be of boulders or smaller field stones, their natural faces to show, and bonded in concrete. Above the top of the cellar windows it is proposed to lay a 6-in. water table belt course made of white Portland cement, then to start courses of sand finished blocks 12 in. high. From the sizes of the blocks on the elevation we will have about,

112— 6-in. blocks 12 in .high
40—12-in. blocks 12 in. high
10—13-in. blocks 12 in. high
30—15-in. blocks 12 in. high
40—18-in. blocks 12 in. high
2—19-in. blocks 12 in. high
40—21½-in. blocks 12 in. high
40—24-in. blocks 12 in. high
4—27-in. blocks 12 in. high
4—27½-in blocks 12 in. high
20—31-in. blocks 12 in. high

and about 75 broken blocks for filling around window sills and heads, porch roof, etc., making a total of about 417 blocks.

Could this house be divided to better advantage so as to have fewer sizes, either by lengthening the initial 6-in. starting block at the window, or by alternating the height of the 12-in. sand block course or of the 6-in. water table?

To trim the building it is proposed to cast of white Portland cement the cornice, door and window heads, window sills, the corners and division blocks (6 and 12 in. alternating) of the twin house, the water table already referred to, the porch cornice, columns and pedestals. No change can be made in the outside dimensions of the building.

I have full details of the porch, window heads, etc., but for the main roof cornice only the detail of a frame building which has a 16-in. overhang and am somewhat doubtful if this can successfully be reproduced in concrete. This I shall be pleased to forward later if wanted, and if the building is carried out along these or modified lines I shall keep an accurate record of hours of labor in making the "forms," erecting and material costs and shall be glad to furnish them for publication in the Correspondence Department for the benefit of any readers who may be interested.

I might add that I have tried to cast a Tuscan concrete column 65 5/6 in. high from a double mold made similar to that described in the issue of the paper for March, 1909, in the article entitled "Casting a Plain Plaster Column," but have not been altogether successful.



Criticism Wanted of Plans and Elevation—Front Elevation of the Building

Breaking Joints in Laying Asphalt Shingles

From P. C. C., Cincinnati, Ohio.—We notice in the correspondence columns of the April issue of THE BUILDING AGE an illustration of a scaffold bracket for asphalt shingle roofs as described by W. M. Spalding, Elmira, N. Y., which seems to be a very practical and economical device for the purpose. In his Fig. 2 showing a portion of the roof in connection with which this bracket is used, we observe, as is frequently the case, that the asphalt shingles are indicated with the joints broken in the center. We believe a great many people are laboring under the impression that this is the correct way to lay asphalt shingles, but architects and builders are likely to be interested in the one-third or break-joint method of laying asphalt shingles, which is decidedly the better plan. As the shingles are all laid ½ in. apart it

is obvious that in breaking the joints one-third there are always two thicknesses of shingles over the joints, while the other plan would give only one thickness over a certain point of the joint. The writer feels sure that those who are not familiar with this method will be pleased to observe its good points.

Note.—The instructions for applying shingles in accordance with the break-joint method read as follows:

Have sheathing boards laid closely and securely nailed. See that surface is clean and free of all projecting nail heads or other obstructions.

Lay one row of shingles *lengthwise* along the entire lower edge of the sheathing, extending them ½ in. over edge of sheathing or inner edge of gutter. Have these fit closely and nail each lower corner, driving the nails 2 in. from lower edges and ends. Also drive one nail half way between these two, using three nails to each shingle on this row. It is best to use 1-in. nails with large, flat heads about ½ in. in diameter, galvanized preferred.

Begin the regular course with a full sized shingle, laying it parallel to and flush with the outer edge or vertical end of the roof. The lower end should be flush with the first layer, allowing ½-in. space between the shingles. Continue the course, using two nails to the shingle, driven 4½ in. from the lower edge.

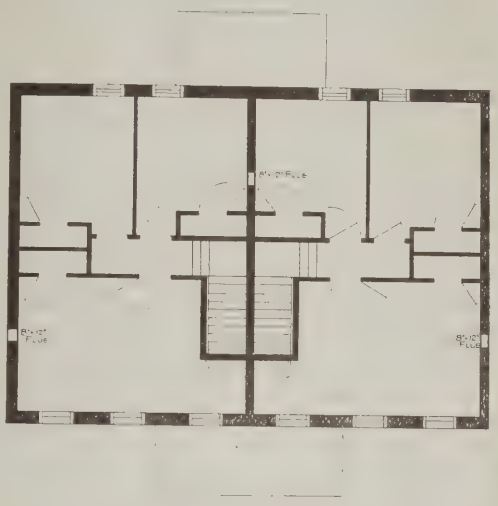
Begin the second row, using a 2/3 size shingle laid 4 in. to the weather, and nail it same as the others.

Begin the third row, using a 1/3 size shingle, with same spacing, etc.

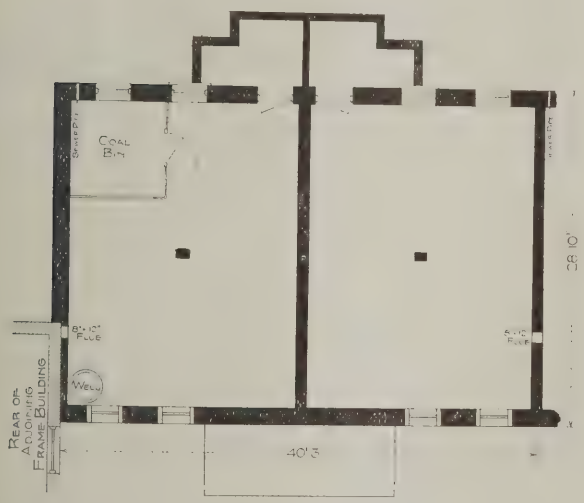
In beginning the fourth row, use full sized shingle again, and continue as before. The ½-in. space between the shingles allows for expansion and contraction, and improves the general appearance. Shingles make a beautiful effect over ridges and hip joints, but metal should be used for flashing and lining gutters. If shingles are laid 4 in. to the weather, and nailed 4½ in. from lower ends all nail heads will be fully covered and protected.

Why the Chimney Tops Overhang

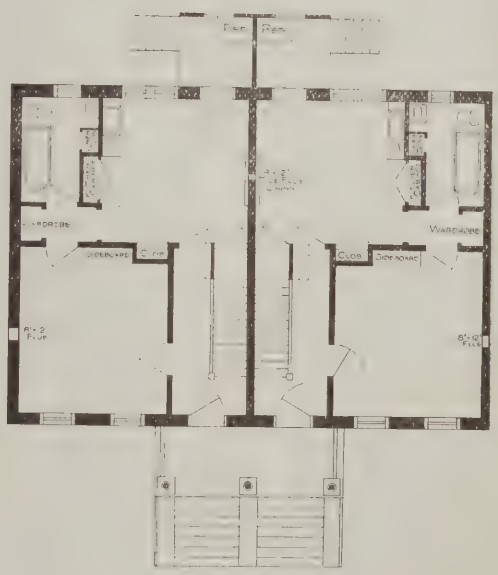
From W. B. B., Southampton, N. Y.—In my answer to "E. A. N." in an issue not long ago, the statement should have read "heat from fires" and not of the sun. Having read the advantages of "D. P. B." in the June issue for 1913 I suppose he is an authority, but his statements were taken from a book and later he may give figures from Ladd. That, however, is not *his* practical experience.



Second Floor Plan



Foundation Plan



First Floor Plan

Criticism Wanted of Plans and Elevation—Scale 1/16 In. to the Foot

Chimneys go east and do not flirt with the Atlantic, as this place, Southampton, is bounded on the south by that body of water and all houses within 2 miles of it, so why not go south? The fact is they go east.

I disagree about chimneys lasting longer plastered inside and that brick and mortar contract when they are wet and freeze.

At 1/16 in. per course, how will a chimney be 2 in. out in 5 ft. when 26 courses dry make that height, and 23 of the courses laid are tight?

A mason well knows a chimney can be put up out of plumb and yet have courses level, as seven out of ten do that from attic floor to roof. It is no

imagination about conditions, as he says, and no sign of a fracture either.

Having been a subscriber for some time I thought a mason could ask the opinion of other masons and exchange ideas, but it seems not. Having built chimneys from the smallest size up to 100 ft. stacks for the last sixteen years I yet believe my statement the right one. It is, however, open to criticism from practical men, as I do not pretend to know it all, but like to read of the experience of others and learn what I can.

Removing Smoke Stains from Fireplace Brick

From L. A. D., Red Lake Falls, Minn.—Will some reader of the paper furnish through the correspondence columns a recipe or method for removing smoke stains from the brick on a fireplace, caused by the fireplace smoking?

Note.—It may be of interest to our correspondent to state that for the cleaning of bricks in the walls of a church that had been blackened by coal smoke and which settled on the coping and washed down over the light colored hydraulic pressed brick, and where dilute muriatic acid, Pearline and other substances had been tried without satisfactory results, the suggestion was made to try the following method: Mix 1 gal. soft soap, 2 lb. powdered pumice and 1 pt. of liquid ammonia, beating the mixture well. After carefully dusting the brickwork, apply the mixture, that should be in the form of a soft paste, in a fairly thick layer with a fiber brush, allowing it to remain for about 20 min.; then rub it in on the bricks with a good, stiff scrubbing brush, using plenty of elbow-grease. Use a large sponge and plenty of lukewarm water to remove the lather, and then rinse with clear water, or, if convenient, use a hose for rinsing. This, if properly done, will remove the most stubborn case of discoloration by smoke from brick or stone.

The Arris Cut System of Handrailing

From W. B. Garvock, Ottawa, Ont.—In the June and December numbers of THE BUILDING AGE for last year there appeared from Morris Williams two articles on the "Falling Line Method of Handrailing" as contrasted with the ordinary Tangent method. Mr. Williams gave the readers a fair sample of the system of handrailing as developed by W. H. Croker of Orillia, Ont. Although some of your readers have been acquainted with this method for the last twenty-five years, it is only within the last three years that Mr. Croker has given to the public the result of a life-long study in the shape of a little book of some fifty-nine pages, together with eight plates containing some sixty-six figures under the name of the "Arris Cut System of Handrailing."

He tells us in the preface, "that the Arris Cut sectional method in connection with a predetermined falling line and the new method of sectional bevels will be found to meet every conceivable case of wreathed rail requirements and produce ideal results."

As one of Mr. Croker's pupils who has put the system to test through many years' practice I can endorse all that the preface claims, and I feel it to be my duty as a reader of this paper from 1879 to its last issue, to call the attention of your handrail readers to the merits of this system as set forth in this little book. Mr. Croker in the early days of this paper frequently contributed to its columns on handrailing and kindred subjects.

Mixing Paints and Care of Brushes

From R. L., Wilson, Minn.—Although I am not a painter by trade I do more or less painting when carpentry work is slack. I come to the readers of the Correspondence columns for a few pointers and trust those so inclined will answer freely and fully.

What is the best way to mix white lead and oil so that when applied to the outside of a building it will look white and not gray? I have heard painters say that you can drown white lead by the way you apply the oil to it.

What is the best way to clean paint and varnish brushes? Should they be cleaned if they are not to be used for a few months or can they be put into linseed oil or kerosene?

Is it good practice to paint when the temperature is hovering around the freezing point?

Laying the Porch Floor

From F. H. Sweet, Waynesboro, Va.—Don't lay a porch floor without making it waterproof; paint the tongues of the boards with white lead before forcing them into the grooves. This will preserve the floors to a good old age, for a porch floor rots because the water gets into the joints. Also remember that a slight slant is desirable to prevent water from standing and soaking in.

Preventing Old Brick Work from Discoloring Wall Paper

From W. W., Baltimore, Md.—I have used some old brick in my building and they burnt through the plaster very badly. Can any of the practical readers of the paper tell me of anything with which I might treat the brick to prevent the discoloration marks coming through the paper?

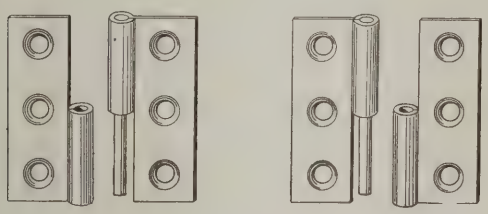
Some Building Terms Discussed

From G. L. McM., Tacoma, Wash.—It seems that, like Banquo's ghost, the questions "What constitutes a half-pitch roof; what a one-third pitch; what a quarter pitch," "What is a right-hand door," and "which side out should the putty side of a glass door be put," will not down, but are perennially recurring for discussion and argument. Many of those to whom these questions occur seem never to stop to reason about them and try to find if there is any reasonable ground for their origin or any reasonable answer to them.

The terms "half-pitch," "quarter-pitch," etc., are

handed down to us from the days before the invention of the steel square and its application to the solution of framing problems. They came into use in the days of "scribe-rule" framing, when the carpenter measured off the width of his building on some convenient level space, measured up from the line between the two points indicating the width, for the height of the ridge, and placed the heel of a rafter at each of the two former points and brought the tops together at the height of the ridge and proceeded to get his lengths and bevels from the intersection of the rafters with each other and the plate line. If he measured up half the width of the building for the height of the ridge, he called it a "half-pitch" roof; if he measured one-quarter the width for the height, he said it was a "quarter-pitch." That method of framing, however, has fallen into "innocuous desuetude," but the terms are still with us and serve to mystify many of the younger members of the craft and enable some of the older ones to employ their spare time in devising strange and intricate explanations for them.

The terms "right-hand" and "left-hand" as applied to doors came into use in the days before some genius invented the "loose-pin" butt (and it is strange how many years passed before that simple and convenient discovery was made), when all



Some Building Terms Discussed—Sketches Showing Left Hand and Right Hand Butts

our butts were either "fast" butts in which the pin was riveted in, or "loose" butts, made in two pieces, one of which was in the form of a socket and the other of a hook, as shown in the sketch. As a result, they could only be used to hang a door to swing the way for which the hinge was designed. Hence it became necessary to agree on some designation that would mean the same thing both to the carpenter, the architect and to the manufacturer of hardware, so that the proper butts might be ordered to fit the doors. Therefore it came to be commonly understood that when standing before a closed door and it would swing around to the right when it was opened, it should be called a "right-hand" door; if it swung around to the left it was a "left-hand" door. With the advent of the loose-pin butts the necessity for the terms is not so pressing, though some of the more expensive locks are made in "right-hand" and "left-hand" styles and are not interchangeable.

In the matter of the "putty side of glass doors" there is not so obvious an answer to the question, and except in the case of doors made specially to be hung one way and no other, like fine outside doors or veneered doors—not alike on both sides—the carpenter must depend on his own judgment. As all doors, in the natural course of events, are subject to considerable slamming, it follows that if the putty side is put outside whenever the door slams the weight of the glass is thrown against the putty with more or less force, and in course of time that will tend to loosen the putty and some day the force will be too much for it to withstand and out will go the glass, smash on the floor. Therefore, wherever possible, the putty side should be put on the inside. Of course, where the glass is put in with stops there is less danger of its jarring loose, but even then if the solid wood is put outside there will be more difficulty in evil-disposed persons removing the glass to gain entrance to the house.

Use of Oak Flooring in a Church

From Manufacturer, Rochester, N. Y.—In regard to the matter indicated by the above title, the correspondents "W. K.," Highland Park, and "Contractor," Moffitsville, N. Y., appear to contradict each other flatly touching the use of 3/8-in. oak flooring in a church laid over a good level subfloor with felt between. Perhaps both correspondents are right, and the explanation is that they are not talking of the same thing.

Square edge flooring such as described by the Highland Park correspondent has a standard thickness of 5/16-in. In some localities this is known as 3/8-in. flooring. Technically it should be called a 5/16-in. parquet strip.

What is generally known as 3/8-in. flooring is tongued and grooved. The Moffitsville correspondent is probably referring to this. Flooring which is only 3/8 in. thick and 2 in. wide is altogether too thin to be nailed only on the edge into the tongue as is other tongued and grooved flooring such as 13/16 in. stock which he advocates. With his prophesy of disaster in the use of such flooring I fully agree.

I call to mind nine churches located in one city, and some of these are the largest churches of their denomination in the country, which are floored in a way which thoroughly proves the point that the 5/16 in. square edge parquetry strips constitute the best floor to give good results at a reasonable price in such large buildings. There are many more churches in the same city, the business managers of which have looked at the floors referred to and have in consequence had their own churches finished up in the same manner. Most of the parquet strips laid in these churches are 1 1/3 in. wide, while a few of them are 2 in. wide.

I think the Highland Park correspondent has had very bad luck indeed with the plain sawed parquet strips. He is absolutely correct in his statement that the quarter sawed material will give much better results than the plain sawed. I know of many floors laid with the plain sawed parquet strips that look very well, but conditions of sub-floor must always be ideal in the use of such material. Even under what seems to be the best of conditions the plain sawed parquet floor frequently goes bad. It is therefore much safer to follow the advice of the correspondent in question and stick to the quarter sawed material.

From J. T. B., Seymour, Ind.—Regarding the inquiry of "L. S." Dixon, Ill., concerning the use of 3/8-in. oak flooring in a church and the com-

ments thereon by "W. K.," Highland Park, Ill., and "Contractor," Moffitsville, N. Y., I wish to say a few words. The Highland Park man gave a conservative as well as a mechanical reply, while "Contractor" tells about botch jobs, etc.

Now tongued and grooved stuff and quarter rounds are made especially to cover up botch jobs. While 13/16 in. is all right for a common floor such as storerooms, warehouses and the like, I have no doubt that "L. S." wanted something artistic as well as durable. I know of a number of 5/16 in. square edge floors in hotel lobbies, churches, residences, etc., that have been installed for twenty-five years and am quite sure they are not "botched," but are giving entire satisfaction and look as well as new where properly cared for.

The proper floor to use is 5/16 x 1 1/3 or 2 in. No. 1 Q. W. O. If steam heated, use 1 1/3 in.; if hot air, 2 in., as the square edge is the proper thing to use in this flooring and my practical experience has taught me this fact. If Mr. "Contractor" thinks everybody botches floors other than himself, I can show him some of the most artistic floors in the Middle West, and if he will confer with some of the important manufacturers in this line I have no doubt they can show him floors in 5/16 square edge that are not "botched."

Now if "L. S." will follow instructions of "W. K.," and see to it that his under floor is in good condition, and at the same time have a practical understanding of the method of laying and finishing floors he will come out all right, otherwise he is apt to "fall down," so to speak, on the job. There are thousands of very good carpenters in the country, but many of them know little about laying artistic hardwood flooring.

I have no use for plain or flat grain flooring. Always use Q. W. O. for a fine floor and there will be no trouble about warping. Use 1¼-in. brads No. 15 set down ⅛ in.; scrape thoroughly, sand and use a good filler recommended by the firm from which you get your floor.

I could go on and write much about the laying and finishing of floors, but I obtained my knowledge from attending expert floor lectures and experience of installing on my own account—not contracting. No man can become an expert until he knows how to lay all kinds of designs of floors and finish to harmonize with any interior finish with which he may come in contact.

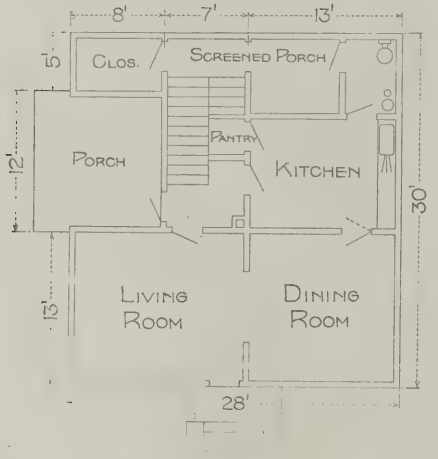
Removing Oil Stains from Marble

From D. P. B., Redford, N. Y.—I would say to "C. C. H.," Brookville, Pa., that he can extract oil stains from marble by making a paste consisting of 2 parts Fullers earth, 1 part soft soap and one part potash mixed with boiling water. Apply to the spots and let it remain three or four hours.

Elevations Wanted for Floor Plans

From Sawdust, Pasadena, Cal.—I have been a reader of THE BUILDING AGE and its predecessor for a long period of years, and now come to the correspondence department for a little aid from some of the other subscribers. I am sending outline floor plans of a small cottage I intend for my own use. My idea is to make the front gable 13 ft. wide and two stories in height. The side gables are to be 30 ft. with studs long enough so that the ridges meet with 1/3 pitch. That will mean lower ceiling on one side of the bathroom.

I want a wide projecting cornice, bungalow effect, with lots of light, and I would like to have some of the practical readers furnish elevations to fit these requirements. I will welcome criticism and any slight changes which the readers may suggest as desirable.



First Floor



Second Floor

Elevations Wanted for Floor Plans, Contributed by "Sawdust" of Pasadena, Cal.

Another New York Theatre

Another theater, capable of seating 1,260 persons, is about to be erected on Broadway, just north of Forty-ninth Street, New York City, and is to cost about $500,000. The plans of Architects Lord, Hewlett & Tallant, and William La Zinsk, provide for a twelve-story building, containing stores and studios in addition to the theater. The building is to have a brick, limestone and terra cotta facade.

Arrangement of Sliding Partitions

The Parallel Door Partition Which is One of the Three Principal Types—Various Details

By E. J. G. Phillips*

THE sliding partition is one of the creations of necessity, having been called into existence by the requirements of modern public buildings, such as churches with separate Sunday-school classrooms, public schools in which the smaller classrooms can be opened to form large assembly rooms, clubs, Y. M. C. A. rooms, libraries and other public buildings where provision must be made for small as well as large assemblages. By means of these movable partitions the same floor space is made to do double service, increasing the usefulness of the building and yielding the greatest returns from the investment.

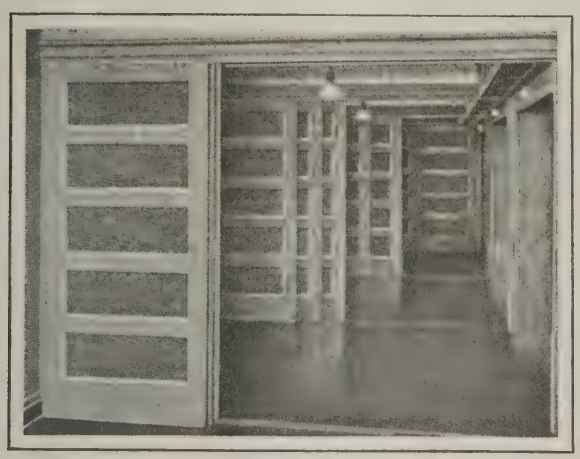


Fig. 1—View in a Sunday School Room Showing Parallel Door Partitions



Fig. 2—Plan of Sunday School Portion of the Church

The large number of these partitions which are now being used and the importance of properly installing the doors and fixtures warrant a consideration of some of the essential features as well as of a few of the details of construction and operation of the different types.

This article will be confined to the discussion of several of the principal types, such as the parallel door, the accordion or folding sliding door, and the flush door partition. Large single doors are sometimes used, but these will not be discussed here.

An installation of parallel door partitions is illustrated in Fig. 1, which is a view of the Sunday-school room in a modern church and gives a good idea of the use for which the parallel door is best adapted. The balcony, as well as the space below it, is divided into individual classrooms by these movable partitions, yet when desired the doors are opened and the entire area is used as one room. A plan of this part of the building is given in Fig. 2.

In the parallel door partition, as indicated by the name, the doors slide parallel to each other and a separate track is provided for each door. The number of doors to each partition is not limited by the method of operation, but a better appearance is gained by using not more than two or three doors sliding in the same direction.

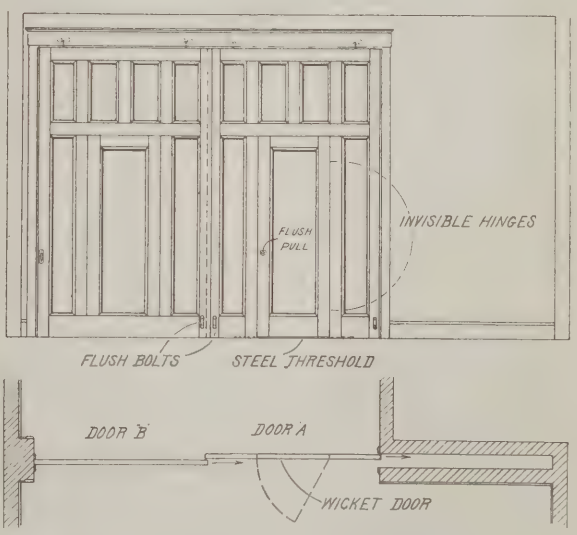


Fig. 3—Plan and Elevation of a Parallel Partition with Wicket Door

Arrangement of Sliding Partitions—A Practical Example

The plan and elevation, Fig. 3, show a condition for which the parallel partition is well adapted. The two large doors form the partition between a small and a large room, and when not in use slide back into a pocket at the right. The pocket is built similar to that for an ordinary sliding parlor door, except that in all cases the sides should be covered with ceiling or other material to present a finished appearance, as in Figs. 5 and 6.

Door *A* laps the jamb at the pocket side and the two doors lap each other at the center of the open-

*Engineer Richards-Wilcox Mfg. Co.

ing. The track for door *A* extends only halfway across the opening, but door *B* requires a track entirely across the opening.

It is not necessary to slide all the doors one way, as they can frequently be arranged as in Fig. 4, where two doors slide to the right and two to the left. In this way an opening of considerable width can be obtained by the use of only two lines of track, and only two lap joints of the doors are visible. A pocket is here shown at each side of the opening; but this is not always necessary, and, indeed, there are many cases, such as in Figs. 1 and 2, where it is better to omit the pockets and use instead a stationary panel or door. This stationary door is built exactly like the sliding doors, but instead of hanging it on a track it is attached permanently to the floor and soffit. The sliding doors when opened occupy positions alongside the stationary door. This method results in a considerable saving of floor space and is particularly adapted for the smaller partitions such as are used between Sunday-school classrooms.

Partitions separating large rooms usually require a service or passage door between the rooms. If the doors are large, as in Fig. 3, the wicket door

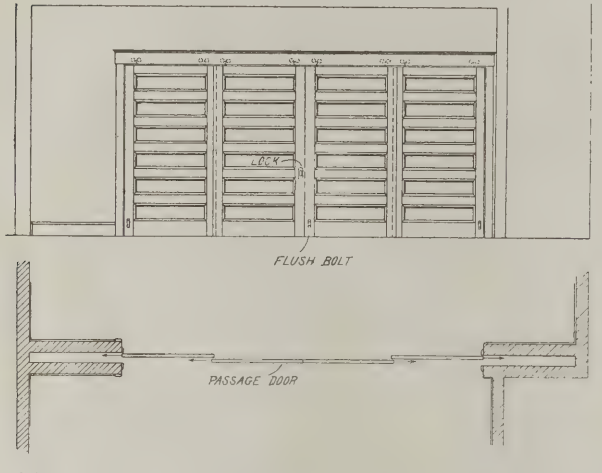


Fig. 4—One of the Sliding Doors Used as a Passage Door

is the best solution. The doors should be built so that the wicket door will not destroy the harmony of design in all the doors. This is exemplified in Fig. 3. Hang the wicket with invisible hinges so that there will be no projections to interfere with sliding the larger door. The lock should be fitted with flush pulls instead of knobs.

A steel bar $\frac{3}{8}$ in. thick is used for a threshold. This is fitted into the bottom of the large sliding door *A*, and serves to tie the door together and helps to hold it in shape. A threshold strip with a double bevel or rounded upper surface is preferable.

One of the sliding doors can be used as a passage door if it is not too large. This is shown in Fig. 4, where one of the center doors is used for this purpose. A sliding door lock or latch is used to lock this door to the next one, which is held firmly in place by a flush floor bolt.

Details of the overlapping portions of the doors, together with a horizontal cross-section of the pockets, are given in Figs. 5 and 6.

The style of lap shown in Fig. 5 is very simple and serviceable. Wedge-shaped strips are attached to the sides of the door and are so arranged that when doors are withdrawn the distance intended these strips interlock, prevent the further movement of the doors and make a tightly closed joint. It is essential that these strips be made wide enough to permit a firm attachment to the doors, as they are particularly susceptible to damage from rough usage. At *C* is detailed a tongue-and-groove joint suitable for use with these doors where they come together at center of opening, as in Fig. 4.

In Fig. 6 astragals are used on the edges of the doors. This method is often used with satisfaction, but has the disadvantage that no definite stop is provided. This will be more fully discussed in a later paragraph. At *D* astragals for the center joint for doors as in Fig. 4 are shown. For doors all sliding one way, as in Fig. 3, the astragal on the outer edge of the last door enters between two door stops attached to the jamb, as detailed at *E*.

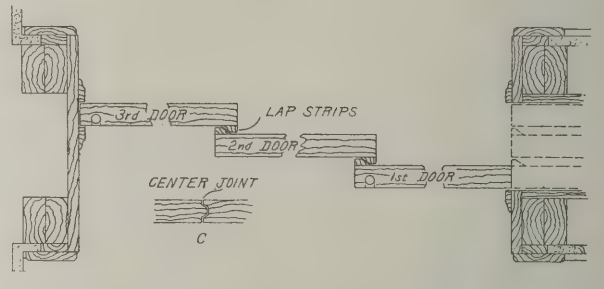


Fig. 5—Details of the Over-Lapping Portions of the Doors

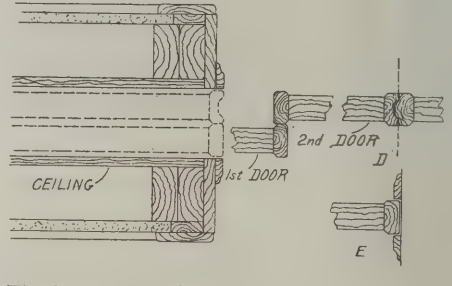


Fig. 6—Horizontal Cross-Section of Pocket

Arrangement of Sliding Partitions—Various Details of Construction

A typical vertical cross-section through the head jamb is shown in Fig. 7. The tracks are attached to the header, which is secured to the studding just high enough so that the bottom of the track brackets will be flush with the bottom of the trimmers. For doors $1\frac{3}{4}$ in. in thickness and not over 300 lb. in weight this distance will be about $3\frac{3}{4}$ in. Hangers for heavier doors require more space. Care in lining up these parts while roughing in the partitions will save considerable time when applying the trim. It is sometimes convenient to hang the tracks directly to the lower chord of a truss or to the ceiling joists, but the exact method must always be decided by conditions met with on the particular building under construction.

The casing and head trim are applied in the usual manner, but the soffits frequently present some difficulty to the builder. To make a neatly finished job the bottom of the tracks should be entirely covered excepting narrow openings through which the pendant bolts of the door hangers move. The outside soffit pieces are, of course, easily applied. The center strips are more difficult to apply, but a suit-

able scheme is shown in Fig. 7. The soffits are held in place by flat-head stove bolts which pass up between the tracks and through blocks of wood which rest on top of the tracks. This does not necessitate setting the tracks farther apart, because the bolts can be placed at intervals between the points where brackets occur and they take up no more space than the thickness of the track brackets.

Another method is to have the bottom of the track brackets drilled and tapped for small machine screws. The soffits can then be screwed directly to the brackets, but care must be taken to use screws just long enough to go through the brackets without lifting the tracks out of place.

Tracks of the trolley or box-shaped type are generally used. These are made in a variety of sizes to suit doors of any weight. The track shown in Fig. 7 is wood-lined and practically noiseless, and is therefore preferable for the lighter weight doors. The hangers are ball-bearing or roller-bearing, and are vertically adjustable.

Floor guides may be used to steady the bottom of the doors. This is particularly desirable where the doors are large. These are designed to compensate

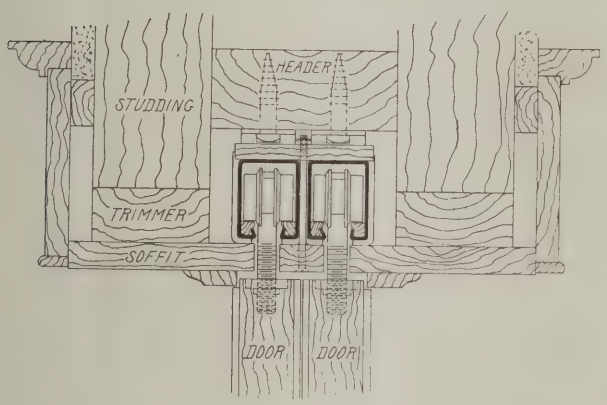


Fig. 7—Typical Cross-Section Through Head Joint

pull set into each door will add to the convenience of operation.

(To be continued.)

A Modern Department Store Building

In connection with the annual review of building conditions, in the February issue of THE BUILDING AGE, we published, among others, a picture of the new Boston Store in Chicago, a building which is probably one of the finest examples of modern departmental stores in the Middle West. The structure is seventeen stories high and has three floors below the level of the sidewalk. It is supported on 123 piers, resting on the bedrock of limestone which underlies Chicago at a depth of 110 ft. below the ground level. The piers are solid concrete and vary

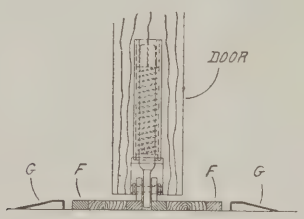


Fig. 9—Vertical Cross-Section

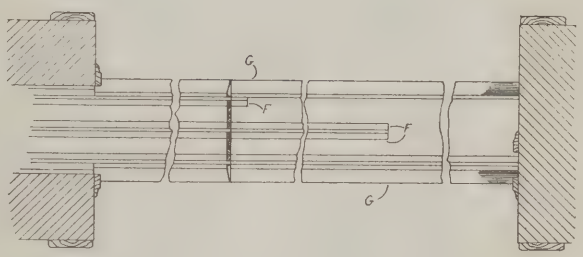


Fig. 8—Plan of Floor Guide for Steadying the Bottom of a Door

Arrangement of Sliding Partitions—Various Details of Construction

for any irregularity or unevenness in the floor. A suitable article is shown in Figs. 8 and 9. The flat floor strips *F-F* and the beveled strips *G-G* are of steel, and form the guide slots in which the rollers operate. The space between the steel strips is filled in with ⅜ in. hardwood flooring, so that the top of the guides finish flat without any projections. If the floors are covered with ⅜ in. hardwood flooring the beveled strips may be omitted and flat guide strips used all around. The guides will then be flush with the floors of the rooms.

The rollers are invisible, being entirely inclosed in the door. They are kept in contact with the guide strips by spring pressure.

A sliding door lock is shown applied to door *B* in Fig. 3, securing it to the jamb. Flush bolts are used to secure the bottom of the doors to the floor. When floor guides are used only one bolt or lock is required for each door. This should be set in the stile of the door farthest from pocket so that it will not interfere with the guide strips in the floor. The end of these strips should be a couple of inches back from the edge of the door to allow space for the plate with which the flush bolt engages. A flush

in diameter from 4 ft. to 13 ft., the average being about 8½ ft., thus assuring a stable foundation.

The floor area of the building is approximately 25 acres. The floors and exterior walls are supported on steel columns, girders and beams. The building is faced on the street fronts with granite up to the third story floor, there being over 15,000 sq. ft. of granite, all highly polished. Above this work the structure is faced with glazed terra cotta.

The equipment is strictly modern in every respect. There are numerous elevators for passengers and freight, two of which are capable of carrying the store's heaviest auto trucks with their entire loads to the sub-basement or any of the seventeen floors. By means of these van elevators, delivery trucks are loaded inside the building, helping to eliminate the congestion of traffic on the adjoining streets and alley. In the second sub-basement is the mechanical equipment which furnishes the power for the operation of the elevators, ventilation, heating, electric current, vacuum cleaning, etc.

It is interesting to note that the sub-basements, basement and first floor are provided with a ventilating system by which pure air is distributed to

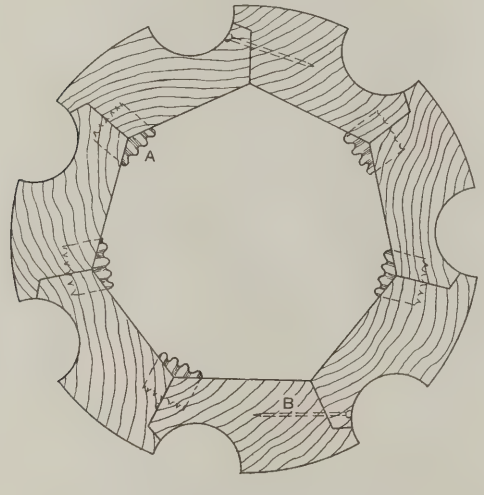
all sections of the building. The air is washed, cooled or warmed, as the case may be, and is supplied in volume that exceeds the specifications laid down by the health department.

The Boston Store occupies the site of the old Champlain Building, and it is recorded that only 34 working days were consumed in demolishing this structure. In the new building 9000 barrels of Marquette Portland cement were used. Plans and specifications were prepared by Holabird & Roche, architects, Chicago, Ill., and the general contractors were John Griffiths & Son Co., of the same city.

Making Shiplap Columns

The shiplap column is made without gluing or turning. The staves are made on the molder, and the everyday carpenter can put them together without clamp chains or any other methods usually used in gluing columns, says C. S. Houston, in a recent issue of the *Wood-Worker*.

Put the columns up in halves and use finish nails, as shown in the cross section at *B*. The joints can be nailed with corrugated nails, as shown at *A*. The



Section Through a Shiplap Column

column can also be nailed all the way round with ordinary as well as the corrugated nails. This makes a very nice outside column, and in a great many cases it can be finished up neat enough to use inside.

The sketch shows end view of the column, put together with corrugated nails. It can be made of 2 x 4 lumber. A scale for making it is, to take the width of the largest end in inches and figure one stave to each inch. This scale will allow one to use 2 x 4's; the width of the staves will average from 3 to 3⅝ in. When making a column 7 in. across the end, it takes seven staves 3½-in. wide, and a column 10 in. across will take ten staves, and so forth.

When working up this column make a sketch of the end, as shown, to get the angle of the staves. If they are open a little on the inside it will not show on the outside, on account of the shiplap joint. This is a simple column and can be made by almost any mechanic. The advantage of it is that it does not have to be turned; it is run with a round face, on the molder, which saves time and labor.

A base and cap can be easily made by cutting it round on the band saw and shaping it on the shaper. We use this method where there is no turning lathe, and find it works perfectly. One of the largest and finest churches in Corsicana, Tex., has columns of this style on it.

Novel Commercial Building Architecture

For some time past active building operations have been in progress on the sites of the old Hoffman House and Albemarle Hotel, at the corner of Broadway and Twenty-fourth Street, New York City, and today there stands a sixteen-story structure which embodies in its architecture several features of novelty. In the building, now rapidly being completed, the first three stories will be utilized for display purposes with iron, glass and limestone front, giving something of a monumental effect. The other stories will be used as lofts. Above the fourth story the façade will be of light ornamental brick, with terra cotta panels.

Another feature of the design is the corner angle at the junction of Broadway and Twenty-fourth Street, which is what in building parlance might be termed "chamfered," with a bold parapet treatment, giving a sharp sky-line and which will take the place of a cornice.

Still another feature is a service driveway, 40 x 80 ft., permitting the largest trucks to drive into the building to unload their freight. The plans were prepared by H. C. Severance and William Van Alen, who place the cost of the structure at $1,350,000.

The Use of Fans in India

It is now possible through the introduction of the electric fan in India for theaters and churches in cities like Bombay to be open all summer, whereas formerly, owing to the almost stifling heat, it was very difficult to induce people to enter such structures in that season. The popularity of such places is now largely dependent on the number of efficient electric fans to force a constant circulation of air. All the leading hotels in the chief cities of India must have electric fans in every room in order to secure and retain their patronage.

The old-fashioned system of cooling rooms by fans in this country, such as is still practised in most communities where electric current is not available, as in country districts, is by means of the personal labor of coolies who work spacious fans hung from the ceilings, with ropes through a hole in the wall, the punkahwallah doing this work outside of the roo man dout of sight.

Spirit stove fans are also used in India. These are attached to and operated by small spirit stoves, especially in country bungalows and in tents, where no electric current is available.

These spirit-stove fans, often mounted on tripods, have added immensely to the comfort of trips into the jungles and in camp life generally. They can be easily packed for transport by mules, elephants, carts or boats, as the case may be. They sell according to size from $20 up to $50. A leading firm dealing in these fans advertises that there are over 20.000 Europeans in India using them.

As an instance of the popularity of electric fans

in India, it may be mentioned that one leading corporation at present has connected to its system over 40,000 fans. The United States is one of the most important sources of supply.

In building the new government offices at Delhi artificial cooling on a much larger scale than can be obtained with individual fans is to be undertaken, Mr. Baker, United States consul, tells us. It is understood that the authorities having charge of this work are considering the possibility of constructing buildings with inner and outer walls between which artificially cooled air can be circulated by means of exhaust fans, the cooling being effected by drawing currents of air through wetted screens.

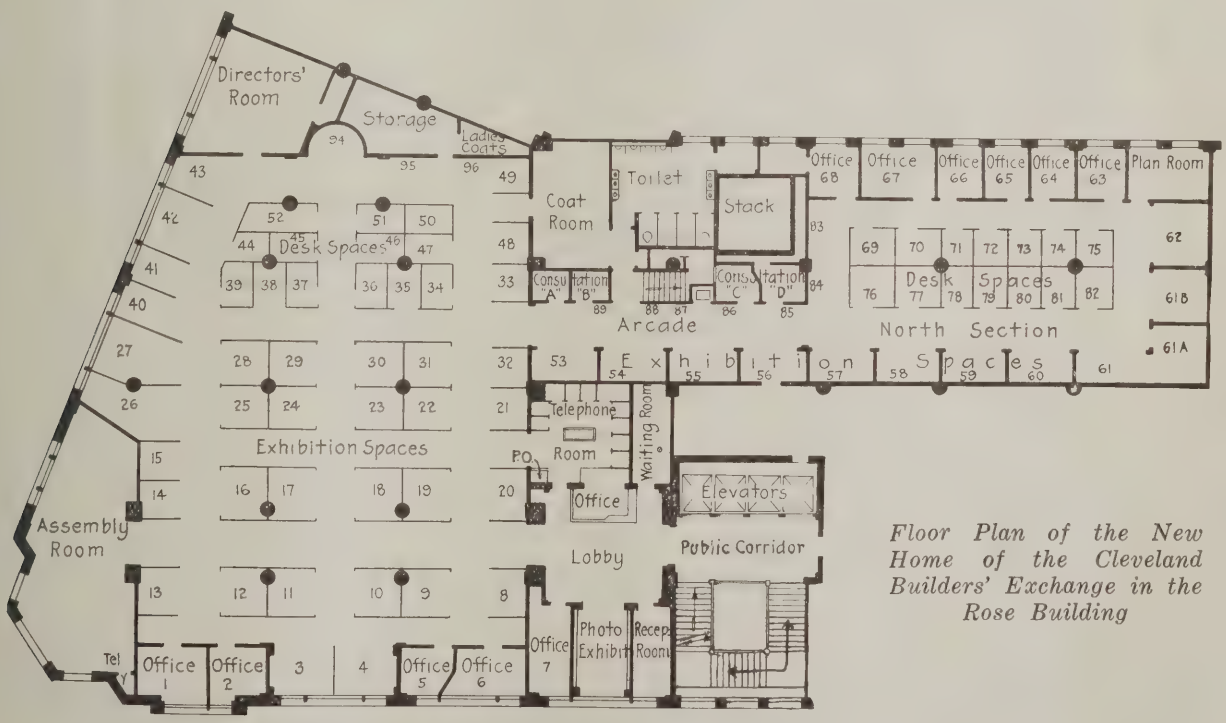
It is thought that possibly by such cooling of the walls during the heat of the day, when the buildings would for the most part be closed up, conditions of comfort might be considerably promoted.

New Home of Cleveland Builders' Exchange

A short time ago we announced in these columns the fact that The Builders' Exchange of Cleveland, Ohio, was soon to occupy more commodious quarters in the Rose Building at the corner of East Ninth Street and Prospect Avenue. The removal is expected to occur on May 1, and we take pleasure in presenting herewith a plan of the third floor of the building in question showing the general layout of the Exchange rooms. This plan, however, does not show space comprising 2,300 sq. ft. on the fourth floor of the building to be used for association meetings, library and general purposes, etc., and is reached by the stairway which rises from the arcade. On the third floor of the building the Exchange has leased for five years 12,500 sq. ft. with the privilege of two extensions for additional five-year periods. This gives a total of about 15,000 sq. ft. as compared with 6,200 sq. ft. in the old quarters of the Exchange.

The entrance to the Exchange is through a wide doorway from the main corridor of the third floor reached by four large elevators giving adequate and rapid service. Inside the door is a lobby, adjacent to which are accommodations for attendant and telephone operator on the one side and the reception room on the other. The main aisle 9 ft. wide extends to the southeast corner of the floor, where is located the daily Assembly Room, all as clearly indicated on the plan. The central space is devoted to desk room and exhibits, while other portions are given over to offices inclosed with partitions, this being a new feature of the Exchange. A large coat room and lavatory, directors and committee rooms, a plan room and several consultation rooms with desirable wall space for exhibits combine to make the new quarters much more pretentious and satisfactory in every way than were those in the Chamber of Commerce Building.

An important feature of the new quarters is the permanent exhibit of building materials, the exhibition spaces being clearly indicated on the floor plan. This scheme affords a medium for the dealer to establish a direct relationship with the members of the Exchange, the architects who visit the quarters, citizens who contemplate the erection of buildings, the city, county and state officials, and a wide range of visitors both from Cleveland and its suburbs as well as from other cities throughout the country. A lively program of association meetings, committee sessions, public and semi-public conferences, luncheons and other features bring to the Exchange from week to week a large and representative patronage all of whom are interested in looking about and getting new ideas. This scheme of permanent exhibit of building materials has been adopted on a large scale in New York, Philadelphia, Chicago, Baltimore, Detroit and other cities.



Floor Plan of the New Home of the Cleveland Builders' Exchange in the Rose Building

A Little Geometry for the Carpenter

A Few Simple Problems Often Used by the Enterprising Building Mechanic in His Trade

By W. S. Wilkin

IN connection with the average work of the carpenter, the joiner and builder, instances are constantly arising which involve simple geometrical problems, and in the present article I shall deal with work which is mostly done with the compass dividers and the straightedge. In Fig. 1 of the diagrams we have a simple problem with which many of us are familiar. The idea is to establish the line *A-B* at right angles to *C-D*. For small work the steel square will answer very well, but for large work where the lines are long the method here shown will be much more accurate for the trammel points may be used on a rod 6 or 8 ft. long. If the line *A-B* does not have to cross the line *C-D* not be used, and if the door was 8 x 8 ft., or something like that, the steel square would not prove very accurate unless the door was jointed perfectly straight. The method here shown, however, is quick and accurate. The line *H-G* may represent the edge of a door or a pencil line, this being entirely immaterial. Mark the point from which you wish to square as *G*, then with any radius and any center as *I*, just so the pencil point cuts at the point *G*, strike the arc *F-G-H*. Next place a straight edge so it touches the point *H* and the center *I*. Draw a line and it will cut the arc in the point *F*. Now with the straight edge draw the line *F-G*, which will be perpendicular to the line *H-G*.

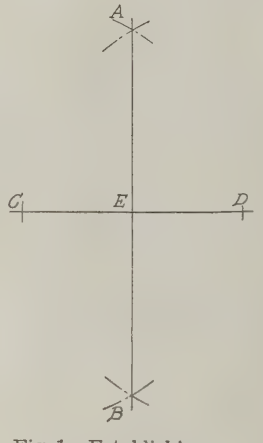


Fig. 1—Establishing a Line at Right-Angles to Another Line

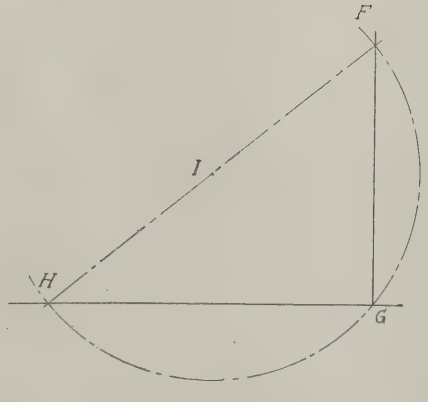


Fig. 2—A Good Method for Use When That Shown in Fig. 1 Is Not Convenient

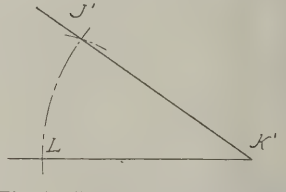


Fig. 4—Showing How to Duplicate the Angle in Fig. 3

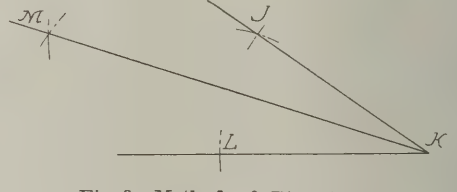


Fig. 3—Method of Bisecting an Angle

A Little Geometry for the Carpenter

at any certain point, take any radius, and with a center anywhere on the line *C-D* strike an arc both above and below the line. Next take another center on the line *C-D* and strike another arc both above and below the line intersecting the first arcs. Then, on the straightedge draw a line through the intersecting points and the result is a line exactly perpendicular to the other.

If the line *A-B* must cross the line *C-D* at a certain point, as, for example, at *E*, take *E* as a center and with any radius strike arcs cutting the line *C-D* at the points *C* and *D*. Then with *C* and *D* as centers and any radii, strike the arcs as explained before. Now with the straightedge draw the line *A-B* which will pass exactly through the point *E*.

In Fig. 2 is indicated a good method to occasionally use when that indicated in Fig. 1 cannot be employed. Suppose we wish to square up a large door. It would readily be seen that Fig. 1 could

In Fig. 3 is shown how to bisect an angle to find the miter cut for a molding to fit in that angle. Let *J-K-L* represent the angle, and with any radius with center at *K* strike the arcs at *J* and *L*. Then with the same, or any other radius, and with centers at *J* and *L* strike the arcs intersecting at *M*. The line *M-K* will then be the miter line.

In Fig. 4 is shown how to duplicate the angle in Fig. 3. Draw the line *L'-K'*, then with the radius equal to *K-J* of Fig. 3 strike the arc *J'-L'*, using *K'* of Fig. 4 as center. Now with *L* of Fig. 3 as center, and with a radius to just cut in the point *J*, move over to Fig. 4, and with *L'* as center, and the same radius, strike the arc at *J'*. Now draw the line *J'-K'*, and it will be seen that the angle *J'-K'-L'* is similar to *J-K-L* of Fig. 3.

In Fig. 5 is shown a quick way of laying off an octagon in a given square. Let *N-O-P-Q* represent the square. Draw the lines *N-P* and *O-Q* which

give the center. With *O* as a center and *O-R* as radius, strike the arc *S-R-T*. Again, with *N* as center, strike another arc and so continue from all four corners. Draw the lines across the corners as shown and the result is the octagon.

Fig. 6 shows how to lay off a hexagon. With *W* as center, strike a circle, then draw a straight line through the circle in any direction just so it passes through the center as *U-W-V*. With the same radius as the circle, and *V* as center, strike the arcs at *X* and *Y*, then with *V* as center strike the arcs shown and from the points thus far found draw the sides of the hexagon. It must be remembered that the side of the hexagon is the same length as its radius. I will try to explain why. A circle has 360 deg., and 360 divided by the number of sides in a polygon always gives the central angle. A hexagon has six sides, therefore, 360 divided by six gives 60 deg.

seven sides. First draw a straight line as 7-*b*-*c*. Then, with a radius equal to the length of the side, and with center at *b*, strike a semi-circle as shown. Divide it into as many equal parts as the polygon is to have sides—in this case 7. The line from 7 to *b* represents one side. Now draw a line from *b* to 2 which gives us two sides. With a center at 2 strike arcs at *d* and *e*. Next with *b* as center, strike arcs at *d* and *f*, also at *g* and *e*. Next with 7 as center strike arcs at *f* and *g*. Now draw a line from *d* to *e*, also one from *f* to *g*, and where these lines intersect, as at *a*, will be the center of the polygon. Now with *a* as center and *a b* as radius, draw the circle. Next draw a line from *b* through 3, and from *b* through 4, etc., which will locate the point at the circle. A better way, however, is to set the dividers at 7 *b* and step around the circle, then draw the sides as shown.

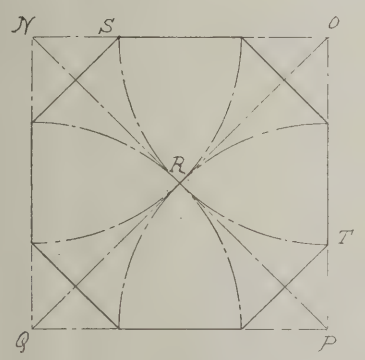


Fig. 5—A Quick Way to Lay Off an Octagon

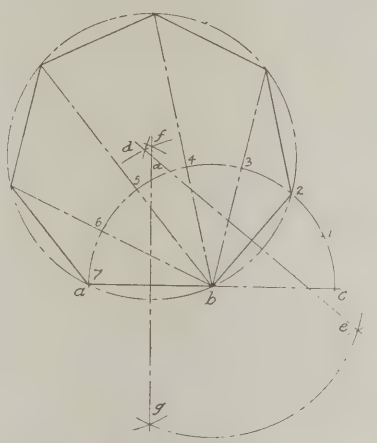


Fig. 7—Laying Out a Regular Polygon

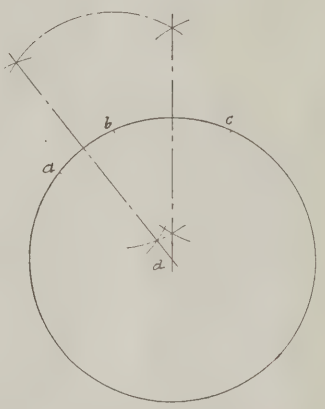


Fig. 8—Drawing a Circle Through Any Three Points Not in a Straight Line

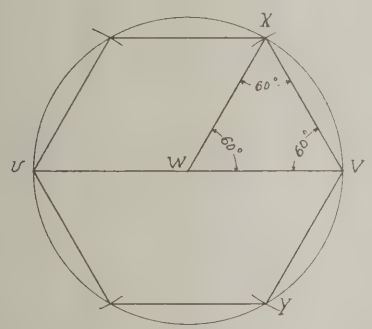


Fig. 6—Method of Laying Off a Hexagon

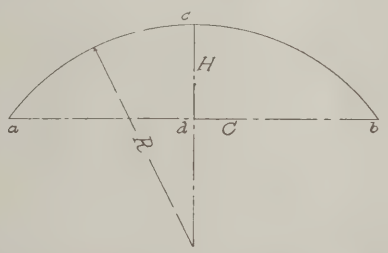


Fig. 9—Finding the Radius of a Circle When Chord and Height of Segment Are Given

A Little Geometry for the Carpenter

as the central angle at *W*. A triangle, regardless of its shape, or the length of its sides, always contains two right angles, or 180 deg. In a hexagon we have six triangles, one being shown at *W-X-V-W* in a regular hexagon. We know the angles at *X* and *V* are the same, and we have already found the angle at *W* to be 60 deg. Now 180 minus 60 equals 120 deg., in the two outside angles and as both are equal, so 120 deg. divided by 2 equal 60 deg. in each of the angles at *X* and *V*, which makes all the angles equal. If all the angles are equal, all the sides must be equal, and if all the sides are equal, the radius of a hexagon must be the same length as its sides, Q.E.D.

In Fig. 7 we show a method of laying out any regular polygon when the length of the sides is known, "without the use of a protractor." In this case it is a hexagon which has

Fig. 8 shows how to draw a circle through any three points which are not in a straight line. Let *a-b-c* represent the three points and we desire to find the center. This is accomplished as in Fig. 7 by taking three centers and drawing arcs as indicated. Then draw the straight lines and where they intersect will be the center.

This may be something which will not be used very often, but is worth remembering, as every carpenter should know how to do it.

Fig. 9 is a diagram for finding the radius of a circle when the chord and height of segment are given. If it were not too large the method shown in Fig. 8 could be used by laying off the chord the given length and using *a* and *b* as centers, together with any radius, using the method in Fig. 1. This will bisect the chord and make the line *c-d* perpendicular to the chord. Mark the height of the seg-

ments on this line and *d-c* and *b* will be the three points from which to work to find the center which will give the length of the radius. If the work was large and a good floor on which to lay it out was not available, it would be much better to use the formula, then the trammel points could be set and if it was a form to be built up of boards one piece could be laid off from a pattern and the rest cut from that. In this way it would not take so much floor space on which to do the work.

Two formulas are here given for finding the radius when chord and height of segment are given.

C = chord
H = height of segment
R = the radius

$$R = \left[\left(\frac{C}{2}\right)^2 \div H + H\right] \div 2 \qquad R = \frac{C^2 + 4H^2}{8H}$$

Figs. 10, 11 and 12 show three ways of drawing an ellipse. Figs. 10 and 12 represent a true ellipse, and Fig. 11 an ellipse that is nearly true, but not quite. This is, however, often used in laying out large work such as making forms for large arches, etc. Referring to Fig. 10, draw *a-b*, the major axis, and *c-d*, the minor axis. With *e* as center draw the quarter circle *c-f*. Divide *e-f* into any number of equal parts as 1, 2, 3, etc. Then divide *e-b* into the same number of equal parts at 1′, 2′, 3′, etc. Next draw 1-*g*, 2-*h*, 3-*i*, etc., and then draw lines perpendicular to the major axis as 1′, 2′, 3′, etc. Make 1′-*g*′ equal to 1-*g*, and 2′-*h*′ equal to 2-*h*, etc., as shown, or using the dividers and marking the points all around on all the lines. Now trace the curve through these points as shown.

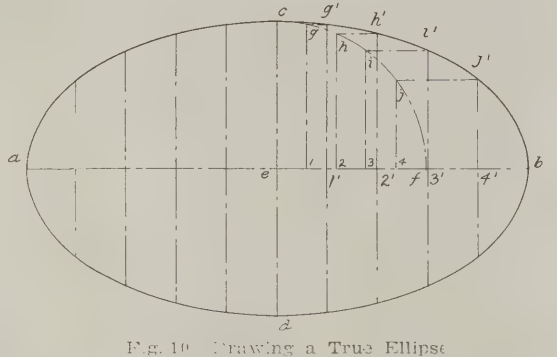


Fig. 10—Drawing a True Ellipse

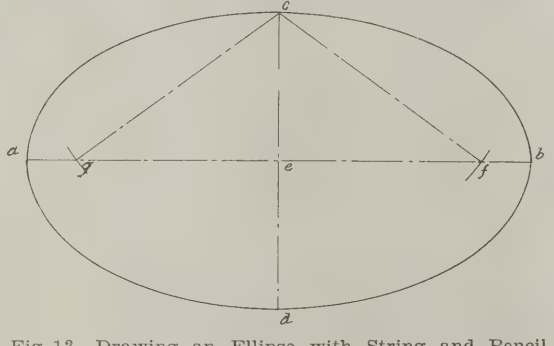


Fig. 12—Drawing an Ellipse with String and Pencil

To draw an ellipse as with circular arcs, as in Fig. 11, lay off *a-b* and *c-d* as indicated. Lay off *a-f* on the major axis, the same length as *c-d*. Divide *f-b* into three equal parts and take two of them as a radius, and with *e* as center mark the major axis at *g* and *h*. With *g-h* as a side, construct two equilateral triangles by using *g* as center and *g-h* as radius. Draw the arcs at *i* and *j*, then with the same radius, and *h* as center, draw another arc at *i* and *j*. Next draw the lines *i-g-n* and *i-h-n*, also *j-g-l* and *j-h-k*. Now with *i* as center and *i-d* as radius, draw the arc *m-d-n*. Next with *j* as center and the same radius draw the arc *k-c-l*.

Now we cannot use *g* and *h* as centers to draw the two ends, for if we use *g-l* as radius it will not quite reach *b*. I have shown two ways to find the centers for the ends. At the right end use 1-*b*-*n* for the three points and find the center as shown in Fig. 8, which is at *o*. With this center and *o*-1 as radius, draw the arc 1-*b*-*n*.

At the left end I show two centers to find, which take *a* as center and *a-k* as radius and draw the arc *k-q-p-m*. With the same radius and *k* as center mark at *p*. Then with *m* as center and the same radius mark at *q*. Then with *q* as center and the same radius, draw the arc *m-a*. Next with *p* as center and the same radius draw the arc *a-k*, which, it will be seen, makes a very good ellipse.

Fig. 12 shows a quick way of drawing a true ellipse with string and pins, draw the lines *a-b* and *c-d* at right angles to each other. With *c* as center and *e-b* as radius, mark the major axis at *g* and *f*. Place pins at these points and fasten on string at *f*, placing a pencil point at *c*. Draw the string around it tight, and wrap it once or twice around the pin at *g*, and hold it down with the thumb, keeping the string stretched tight with the pencil. Trace the curve *a-c-b* and trace the lower half in the same way. The string will be just the length of the major axis.

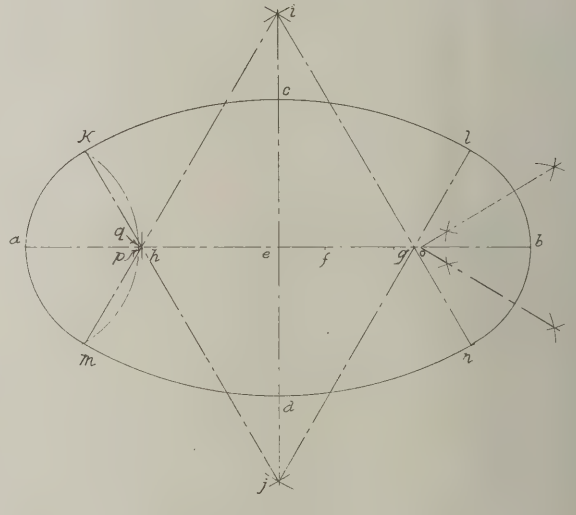


Fig. 11—Drawing an Ellipse with Circular Arcs

While I may not have explained this work just as it should be, I think the drawings will speak for themselves so that the reader will readily understand them. Even though he does not have use for these problems at the present time he should preserve his copies of THE BUILDING AGE, as I suppose most readers do, because there may come a time when it will be convenient to refer to the problems for the purpose of finding just what is wanted.

A Little Geometry for the Carpenter

A Modern Fire-Resisting Cottage

Walls, Floors and Roof of Reinforced Concrete Construction—Many Details of Interest to the Builder

THE prevailing tendency in home building at the present time, especially in those localities where fire protection is limited and the hazard correspondingly great, is more and more in the direction of a style of construction calculated to resist the spread of flames. It is well known that concrete serves an excellent purpose along this line and that a frame superstructure can be rendered in large measure fireproof by the proper application of this material. A most interesting example of what can be accomplished by such a combination of materials with metal reinforcement is illustrated herewith, the house being located in one of the many attractive suburbs of which the city of Cincinnati can boast.



A Photographic View of the Cottage of Mr. L. R. Hildreth at Walnut Hills, Ohio—Architects and Builders, Newcomb & Jenkins, Cincinnati

The cottage is 1½ stories in height and provides upon the main floor a living room of generous proportions, a dining room, a kitchen, one bedroom and a bathroom. On the second floor are three sleeping rooms, two of which are of unusual size and provided with commodious clothes closets. There is also a bathroom on this floor.

The cellar extends under the entire area and has a cement floor. Framing timbers consist of 2 x 6 in. yellow pine sills with corner posts made of two pieces of 2 x 4 in. yellow pine; rafters 2 x 6 in. spaced 16 in. on centers, and the main girders supporting the first floor are of 8 in. I-beams weighing 18 lb. to the foot and supported by two pipe columns 4 in. in diameter. The girders supporting portions of the second floor are constructed of 2 x 8 in. joists spiked together.

The first floor joists are of 2 x 12 in. yellow pine spaced 20 in. on centers, while the second floor joists are 2 x 8 in. yellow pine spaced 16 in. on centers. The rafters are 2 x 6 in. spaced 16 in. on centers. All floor joists are stiffened with rows of 2 x 1 in. bridging.

The interior and exterior wall studs are covered with No. 28 Keyridge sheet metal reinforcement placed with the smooth side out to receive the plaster. This material has perforations in the sheets which are burred out and overlap each other at an angle of 45 deg. This causes a series of truss shaped

projections or flanges which give great rigidity to the finished work.

The exterior walls, as will be seen from the halftone engraving upon the first page of this article, are finished with stucco applied to sheet metal reinforcement. The scratch coat was made of one part cement, 2½ parts clean sharp sand and ½ part slacked lime. The second or finish coat was made of one part cement and two parts of sand with hair in the proportion of one bushel to one bag of cement.

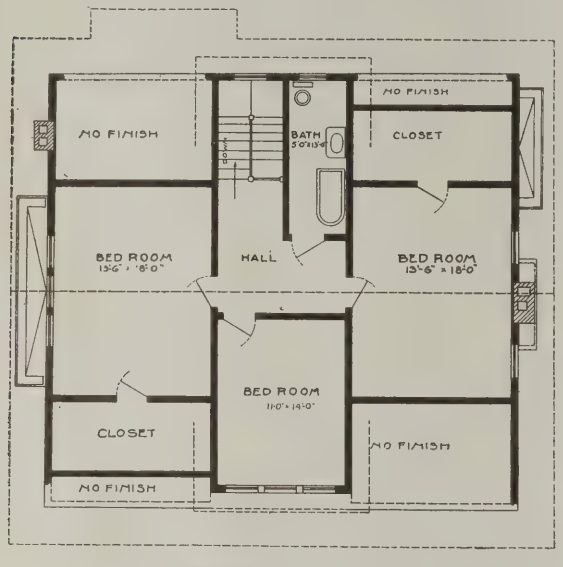
The construction of all interior walls and partitions consists of Keyridge on wood studs, the latter being placed 16 in. on centers. Regular standard mixture of plaster was used for the interior partitions, which are tinted a cream color and have a sand finish. All plastering was applied to the smooth side of Keyridge and all corners were protected with "Edmanco" corner beads.

On top of the floor joists were placed No. 24 Keyridge sheets having the groove side up. On this was placed two inches of concrete with wood sleepers embedded, to which to nail the wood flooring. An idea of the construction may be gathered from an examination of the detail presented herewith.

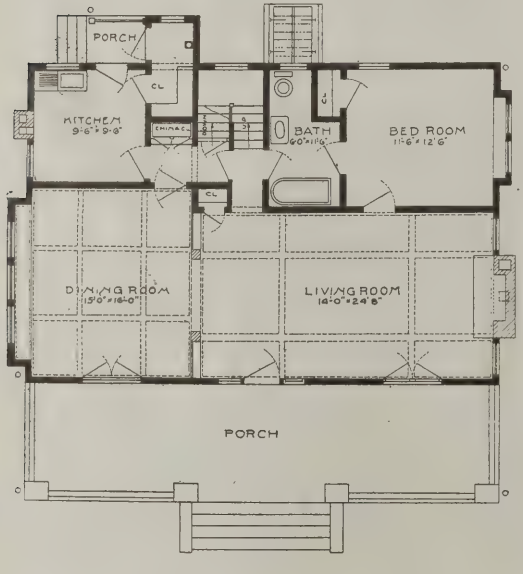
Some of the partitions throughout the house consist of a double wall or are solid and 2 in. thick. Where the solid partitions were used the Keyridge sheet was fastened at the floor and at the ceiling and run in a vertical position. A temporary wooden support was extended through the center partition horizontally and well braced from the floor, this support being removed after the first coat of plaster had been applied.

The stairs were also reinforced with Keyridge, the sheet being bent to take the special form of each stair. The concrete was then applied with a trowel to the proper thickness.

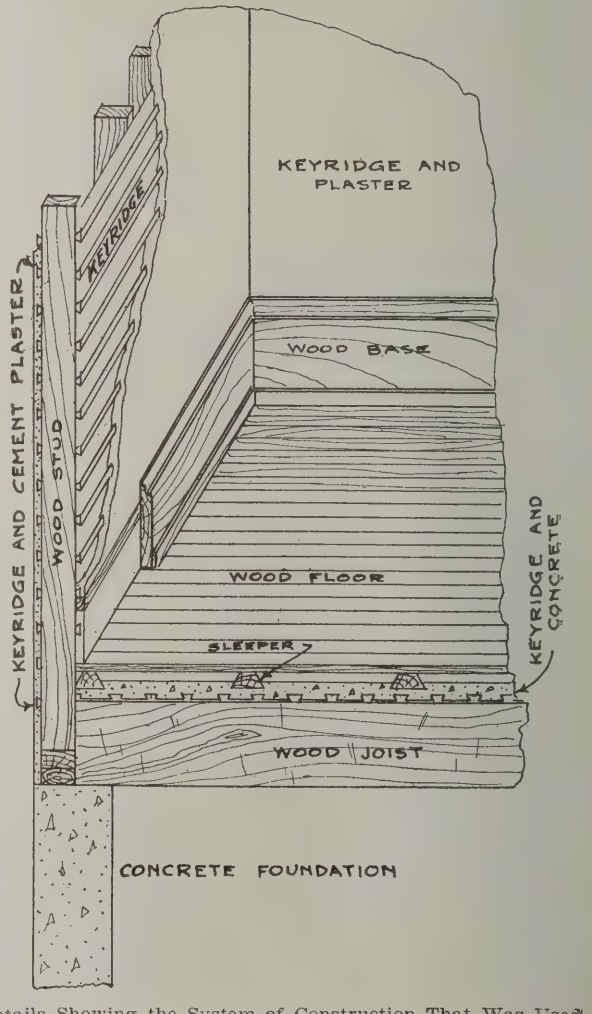
The concrete slab for the roof was applied in the same manner as that for the floor. In order to provide nailing grounds for the roofing tile small strips of wood were embedded in the concrete at the proper distance on centers so that each and every tile could be securely nailed and held permanently in position. The roof was covered with Edwards Metal Spanish Tile, which are made from a special brand of tin plate and are 10 x 14 in. in size. All metal tiles were given a good coating both sides of special "Edmanco" paint in exact imitation of grey tile in color.



Second Floor Plan



Main Floor Plan
Scale 1/16 In. to the Foot



Details Showing the System of Construction That Was Used

A Modern Fire-Resisting Cottage—Newcomb & Jenkins, Architects and Builders



Interior of the Dining Room with a View of the Living Room Beyond

The floors in the rooms of the main story are double. The sub-floor consists of sheathing boards running diagonally and nailed to the sleepers embedded in concrete, and then on top of them were placed the finish floors of hardwood. The rooms in the second story have 2-in. yellow pine flooring.

The wood trim in the living room and dining room is of quarter sawed oak finished in fumed oak.



A Modern Fire-Resisting Cottage—View in the Living Room Looking Toward the Open Fire Place

The beam ceiling is of similar finish in both rooms. The dining room has a plate rail to match the balance of the finish. The kitchen and the bedroom on the first floor have white pine trim.

The rooms on the second floor have white pine trim treated with three coats of white lead well rubbed and a finish coat of white enamel with mahogany stools and picture molding. The doors are also finished in mahogany.

A house constructed as here described is fire-resisting to an extent to assure low rates of insurance and is especially adapted for the rural or suburban districts where fire protection is usually found in a limited degree.

The cottage was erected for Louis Robertson Hildreth at Calvin Cliff, Walnut Hills, Cincinnati, Ohio, in accordance with plans prepared by Newcomb & Jenkins, Cincinnati, who were both the architects and the builders.

The Keyridge Reinforcement as well as the Metal Spanish Tile were furnished by the Edwards Mfg. Co., 423-443 Eggleston Avenue, Cincinnati, Ohio.

Graduation Exercises of the New York Trade School

The thirty-fifth annual commencement of the New York Trade School, Sixty-seventh Street and First Avenue, New York City, was observed with appropriate ceremonies on the evening of March 29 when graduates, relatives and friends filled the auditorium to overflowing. The guests of honor included members of the Board of Trustees and representatives of the trade associations.

The exercises were opened by President R. Fulton Cutting, who in his usual graceful manner and in well-chosen words urged upon the graduates the fact that their future depends upon the proficient, honest and intelligent application of the training gained in the school. Many employers have no idea of trade education, but they can be shown what the trade school education means by the work graduates do. There is plenty of room at the top, and to get there, even under fair competition, means hard, honest work. Persistency and determination are essential factors—only through the exercise of honesty, sobriety and persistency in trade work comes success. A large number of graduates are now employers. With these ideals uppermost in the mind, and with a good character success is assured. Graduates were advised to join the trade union, which is a protection against conscienceless employers, even though it has narrow views on trade education. "Keep your heads sound and clear," he said. "Remember that you had the advantage of training, and influence the unions to take a broader view of this subject."

Prof. Charles A. Beard of Columbia University made the commencement address, in the course of which he related instances from the life and work of Abraham Lincoln to inspire the young man ready to take up their life work. He pointed out that Lincoln was not in a log cabin of the poorest type. His father was a worthless man, and his mother died when Lincoln was still a child. From his stepmother the boy first learned of industry, courage and hope. He was truly educated in the school of adversity—he was self-taught. He studied not many books, but few. He spent hours at study alone in his poverty and adversity, and there he gained the virtues that perpetuate his name as that of a great American. Courage, patience, charity and humor in times of adversity were among his great qualities. It has been truly said that out of Abraham Lincoln's life have come the "vibrations of deathless music."

The total number of graduates for the season was 115, of which 72 were in the day classes and 43 in the evening classes.

The "honor" man of the carpentry class was William Miller of Brooklyn; of the class in plastering, Ernest Greenhalgh of West New York, N. J.; of the class in sheet metal work, William R. Yunker, Newark, N. J.; of the steam fitting class, William G. Knoll of Brooklyn; of the class in sign painting, Frederick Rieger of New York City.

In the electrical class the honor men were:

John E. Hoey, Jr., Ridgefield Park, N. J.
Howard M. Halpin, Bethel, Conn.
Frederick L. Kirk, Bethel, Conn.
Peter F. Reynolds, Jr., Astoria, L. I.

The honor men in the plumbing class were:

Fred R. Robertson, Bayside, N. Y.
Eugene J. Miller, Elmira, N. Y.
James M. Cawley, Wilkesbarre, Pa.
Philip G. Armknecht, Elizabeth, N. J.
Nathan Klein, Taunton, Mass.
Alvin Frevert, Lindenhurst, N. Y.
William H. Grau, Rensselaer, N. Y.

The annual prize given by the Manhattan branch of the New York Master Plumbers' Association for proficiency in plumbing was a gold medal in the form of a Maltese cross on a circular background suspended from a horizontal bar bearing the name of the school. In the center of the gold field was the seal of the association surrounded by a blue circle bearing its name. The reverse side, inscribed with the winner's name, stated that the medal was for good workmanship, knowledge of plumbing theory and practical application. The medal was presented to Fred R. Robertson, son of Fred Robertson, a master plumber at Bayside, L. I. The exercises were brought to an end by the order of singing "America," after which the work of the students was inspected by the visitors.

Big Buildings for Brooklyn

Among the improvements recently commenced in Brooklyn mention may be made of three large reinforced concrete loft buildings, one of which will cover an area 200 x 125 ft. and rise twelve stories in height, while another will cover a site 460 x 75 ft. in area and rise six stories in height. The third building is a twelve-story and basement factory, 101 x 106 ft., which will occupy a site on Washington Street facing the Brooklyn Bridge. The plans have been prepared by Architect William Higginson, 13 Park Row, New York City, and the contract for the work has been let to the Turner Construction Company, 11 Broadway, New York.

Plans have been filed by George & Edward Blum, architects of New York City, for a twelve-story loft building to be erected in West Thirty-eighth Street, at a cost of $250,000.

Cabinet Work for the Carpenter

Constructing That Comfortable Piece of Furniture Known as the "Day-Bed"—Various Details

By Paul D. Otter

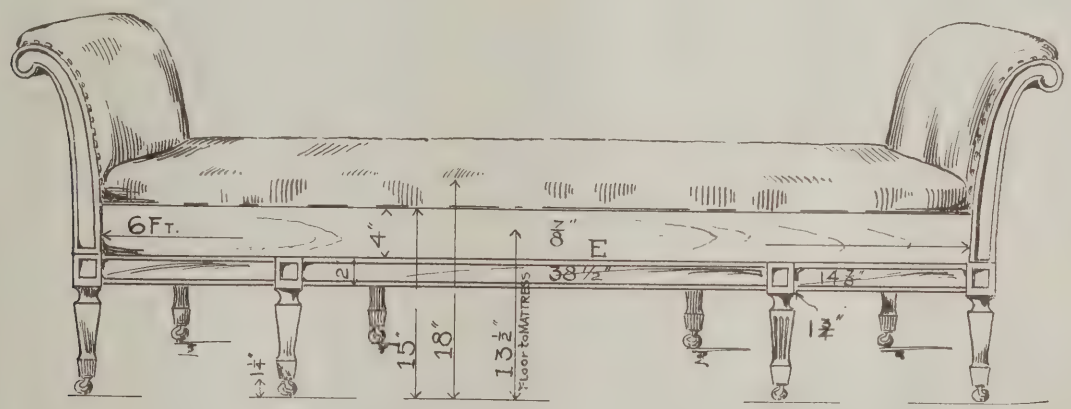
THE "day-bed" is an ancient form—"used for rest during the day; a lounge or sofa," as the dictionary tells us. There is no other form of furniture which is being brought back from the past with more reason. Our present day is lived so fully and intensely that there is need of putting on the brakes, slowing down and coming to a distinct pause at sometime midway of bedtime. A couch, sofa or davenport, located in one of the lower rooms of the home is a provision which will meet not only the requirements of modern furnishing, but will ever offer a haven of rest if not a hasty nap, when the spirit lags, or time does not permit one to retire for rest in bed. Did you ever notice that in some—men and women—daily vigilance is so imperative that it is thought unmanly, or suggesting weakness, to seek a bed in daylight? No! Fatigue and nerve weariness must be lived through unrelentingly until the customary bedtime, when the bed in the upper room relieves the body from fatigue and the mind from the cares of the day.

The revival of the "day-bed" is not to reproduce it in the proportions of a bed, but more to bring back its usefulness and hold to its full body length of not less than 6 ft. between ends.

Its depth of 33 in. is ample to preserve a proper form for the living room, large hall or sun parlor. With these proportions it has a dual purpose as a sofa for several persons, or a full length reclining couch, which also can be used in a comfortable way at night on occasions when all bed rooms are occupied. With this double purpose in view, the principal aim should be to have its height from the floor made the same as a comfortable upholstered armchair, allowing for such a large piece as this to be fitted with casters. It might be well then in laying out a working detail drawing to secure the casters to be used, or know their height, for there can be no cutting off of legs in this form of "spade leg." Again, it would be better to err in a final upholstery height of say 16 in., rather than over 18 in., where such a deep seat is concerned. You will observe that beyond the height of the side rail *E*, the upholstery height will be somewhat dependable upon character of mattress *F*, and the tension of spring work supported by slats *D*.

With some it may not be possible to have the frame furnished by a skilled upholsterer, and with this in mind a simple substitute method is given which will present a becoming outward appearance. For this reason the upholstery description precedes the description of what will prove a very simple piece of woodwork in the hands of an interested woodworker.

The plan suggested, to avoid expense of special made mattress, or box mattress with over-mattress, is to cut down a regular bed mattress to a width of 30 in. There are few homes where a used mattress may not be used for this purpose.



Cabinet Work for the Carpenter—Fig. 1—Front View of a "Day-bed"

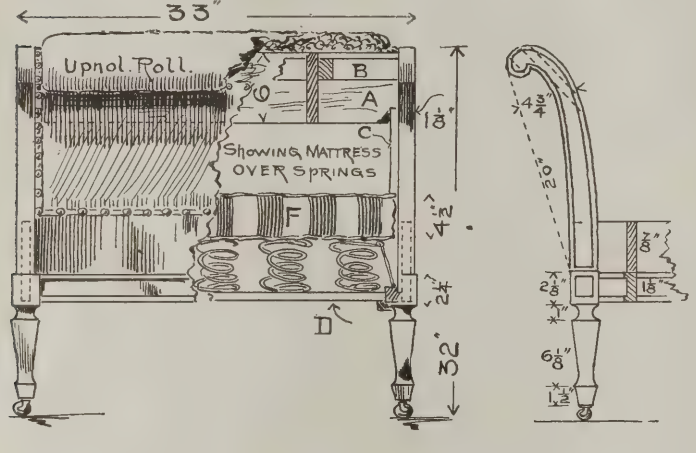
A sharp carving knife drawn several times along a straight edge will sever the material at the proper width. A new facing of ticking may then be very readily box-edged in like manner to the other three sides by any needlewoman.

This will give a mattress 3 ft. x 6 ft., and presumably 4 or 5 in. in thickness, depending on quality of original filling. As for a suitable and becoming cover or spread to mattress there are many cheap to expensive patterns of made-up couch covers running from jute to expensive tapestry material. In connection with the selection of the cover, it is possible to select an appropriate piece of goods for both ends, inside and out, which will match in character, or be of the same tone as the cover to the mattress. Denims and terry of a good grade are very satisfactory also, for covers and ends.

Differing from the covering of the bed mattress, the spread in this case will completely envelop the

edges, and the surplus be tacked under the mattress, or disposed of on the inside of the rail, which will enable the cover to be removed frequently. You must know your mattress thickness so that the rails *E* will not be more than 3 in. below its surface or sufficient to contain it without exposing the under part. Should the rails be too high, a person of some weight will depress the mattress and springs to the uncomfortable striking point.

Now for the system of springs which support the mattress, for it is a system of five springs to a slat (*D*) depth, and nine rows in length. Each spring with a slight padding of burlap is secured with staples to the slat. With a disposition of slats and springs properly spaced, the upper control of the springs may now be started from the back to the front. Cutting nine pieces of heavy twine to a generous length for back to front springs, cut also five full lengths for end-to-end springs. You will observe the purpose is to so start tieing with a surplus end of twine that each top of coil spring will be tied and caught up on the opposite side with a knot, and with care in holding the spacing correctly, pass on from back to front spring of first slat leaving hang ample surplus of twine. The "springing up" work begins from the back to front



Cabinet Work for the Carpenter—Fig. 2—End View of "Day-bed" with Detail of Foot and Scroll End

by driving a 10-oz. tack at end of cleat *D* to which, before driving in, fasten twine with a slip knot, then drive home and lock with another well directed tack. Draw the twine upward, meanwhile pressing the first spring down about 2 in., engaging the top coil wire with a slip knot on the outside. Pass it across and secure it to the opposite side with a slip knot.

Care must now be observed to press down with a straight edge the remaining springs in the row to the required height before securing the surplus end of the twine in front by tacks in the same manner as at the start. Continue with the next row and so on, then in like manner with each spring to the opposite end until the five rows are cross-tied. The springs for this purpose are what are used for sofa and couch work, and should be double-cone in shape, 8 in. high and the usual diameter of 6 in. A cover of cheap canvas, or low grade denim, or silesia may now be seamed and with ample margin, tacked over one side of the minor rail at the bottom and lightly stretched up and over the springs to the other side and down at the ends, thus making a surface well calculated to receive the loose mattress.

Padding the ends may now begin, noting that the purpose will be to have mattress and padding press fairly together. The board *A* with the added cleat piece *B* is in the nature of a rough head board securely joining the two scroll ends, and is fastened to them in a diagonal manner, forming a solid foundation to build up in a conforming manner the upholstery filling consisting of part tow, curled hair and top layer of cotton. The open space between the head board *A* and the end rails is covered with tightly stretched canvas or upholstery webbing. This forms a surface to fill against with tow, hair and cotton, using a stout twine and an upholsterer's circular needle to hold it in place at frequent intervals, and using tacks and twine over the head board to hold it in place, meanwhile working and molding the material to the proper form full up to edges and end of scroll when a coarse piece of cotton cut to full size is tacked, starting from the inside of the end rail.

Before tacking the cover in place put the final layer of cotton over tow and hair, and pull the cloth upward, over and well under the end board *A*, pressing and molding with the hands. You will then know whether the material is to be added or removed before tacking down to a well-shaped roll.

The sides of cloth are now to be conformed neatly in a rounded manner and tacked against cleat *C*, provided for that purpose. Care in conforming this undercover will make the work of putting on the outer cover a simple matter, edging it with a proper gimp and finishing nails.

The cover for outside of ends should be put over and under the cloth and finished with the same gimp and nails as on the inside.

Large well-filled pillow cushions will naturally be suggested later on in giving such a seat a broken outline and added comfort.

By the use of eight legs brought to a spade-shape foot as shown, and the upper part finished to a square of 1⅞ x 1⅞ in., the frame of the bed will consist of an oblong frame 33 x 75¾ in. The lower rail is 1 in. x 2 in. x 1⅛ in., finished off flush with top of posts which set forward slightly. Rails may be treated with two grooved lines, or have a channeled effect as shown. Between the front and back intermediate legs there should be well secured cross bars, and on the lower inner edge of front and back rail, a well secured square support, partly notched out for slat spring support, *D*, which are ⅞ x 5 in. wide. The upper scroll posts when prepared and treated in keeping with the lower rails and leg squares are then framed up with end rails and side rails *E*. The entire frame is then jointed off to a careful fitting and secured by glue and dowels to the lower bed. Reinforce on the inside with necessary glue and corner blocking and provide cleating for upholstery as explained.

As the frame is a simple treatment of the "Adam style" it is recommended in mahogany, birch, gum or walnut rather than in oak. The finish should be a dull rub, and let me remark right here that it's a good plan to use plenty of elbow grease.

Features of Armory Construction

Erecting the Drill Hall Frame and Placing the Concrete of a Modern Armory Building

ONE of the largest National Guard structures in the West is undoubtedly that of the Second Infantry Armory now rapidly nearing completion in Chicago, having a frontage of 236 ft. in West Madison Street, and extending through to Monroe Street, a distance of 266 ft. An alley leads through the center of the block parallel with West Madison Street, and in order in build across this alley it was necessary to supply alleys on both sides of the building from the center of the block to Monroe Street. This produced a T-shaped structure, the West Madison Street frontage of which is three stories and basement in height with a large central tower five stories high and a rear arched drill hall 300 ft. wide, 126 ft. long and 90 ft. high.

The building is of fireproof construction throughout with reinforced concrete foundation walls and floors, including the balcony, which extends around three sides of the drill hall. In the basement are twenty-eight shower baths, general toilets, wardrobe accommodations for 7000 people, boiler and fan rooms, wagon storage connected with the alley by a wide runway, also an up-to-date range for rifle and pistol practice for the men.

On the first floor are two field gun company rooms, quarters for the hospital corps, the band, the quartermaster's department, and twelve company rooms facing the drill hall. The second floor contains quarters for the medical examiner and various staff and commanding officers. On the third floor is a gymnasium, a banquet hall, shower baths, smoking rooms, kitchen, etc. The fourth floor has two signal corps rooms, and the fifth floor, storage and fan rooms.

Some of the construction features of greatest interest to builders are undoubtedly the methods used in erecting the large arched frame for the drill hall and placing the concrete in the extensive area covered by the building.

The roof and balcony of the drill hall are carried by three hinge arches having a span of 198 ft. and a height of 89 ft. measured between the pins. They are spaced 37 ft. apart and are connected by deep latticed struts on which are carried the curved purlins which support the roof. In the course of erection the arches were assembled on the ground and completely riveted to make two building segments each about 120 ft. long. They were erected by a steel traveler 38 ft. square and 38 ft. high, on which were mounted two 90-ft. booms. The heels of the segments were first lifted into the cast supporting shoes and the heel pins driven. Each boom was then attached to a segment near the crown pin and the two segments lifted simultaneously by rocking them back on the heel pin until the crown pin holes registered, thus permitting the crown pin to be driven. By this method the booms were required to lift only about one-fourth of the weight of the arch, the total weight of which was about 36 tons.



Interior of Armory Building During Process of Construction

All of the immense amount of concrete required in connection with the building was mixed in two one-third yard "Standard" low charging mixers, made by The Standard Scale & Supply Co., Chicago, Ill. The materials for the concrete were delivered by motor trucks around the building near the points where it was to be used, and the mixers moved along as the work progressed, thus permitting a considerable quantity of the concrete to be spouted directly from the mixers into the "forms," and when delivering in carts it was necessary to

wheel the concrete only a short distance. The portability of the mixers also enabled them to be moved several times during the progress of the work by simply picking them up bodily by the travelers and carrying to a position where it was desired to mix additional concrete. When laying concrete for the floor of the drill hall the same method was pursued, thus rendering it unnecessary to wheel any of the materials a long distance.

For placing the concrete in the balcony the mixer was stationed near the center of the drill hall and equipped with concrete tower and spout. The latter was suspended from the steel frame of the drill hall, as shown in the picture, so that it delivered concrete to a bin on an elevated platform, from which it was gated into wheelbarrows for distribution. The reader will readily note that the economy of a large part of this construction work was obtained in a measure through the portability of the mixers used, as this afforded a great saving in the amount of manual labor required both in delivering the material to the mixers and the concrete to the forms.

The plans of the armory were prepared by State Architect James B. Dibelka, and the general contract was executed by C. E. Carson Co., City Hall Square Building, Chicago, Ill.

Building in Manhattan in March

According to the Bureau of Buildings for Manhattan, New York, plans were filed in March for 46 new structures, costing $5,262,800, as compared with 47 costing $4,134,025 in March, 1915.

Among the more important improvements for which permits were issued in March were a $400,000 addition to the Hotel Apthorpe at Broadway and Ninety-fourth Street; a $450,000 four-story students' building for Barnard College, on Claremont Avenue, just above 116th Street; a $600,000 duplex studio apartment building, fifteen stories high, at Central Park West and Sixty-seventh Street; a $350,000 five-story power plant, corner of Water Street and Burling Slip; a $150,000 six-story showroom and loft buildings on Thirty-third Street, adjoining the Astor Court Building; a $300,000 twelve-story loft at 104 to 110 Green Street; two five-story flats at 138 to 150 Haven Avenue, to cost $200,000; a six-story telephone exchange, corner of Manhattan Avenue and 108th Street; a $100,000 twelve-story office building on Cortlandt Street, west of Broadway; a $170,000 twelve-story building for the Lenox School on East Seventy-eighth Street and East Seventy-seventh Street; an $80,000 six-story dwelling for Harris Fahnestock on Sixty-sixth Street, west of Madison Avenue; a $250,000 twelve-story factory building on Thirty-eighth Street, east of Sixth Avenue; a $225,000 six-story factory, corner of Frankfort and Rose Streets; a $140,000 twelve-story loft, adjoining Lord & Taylor, on Thirty-ninth Street, west of Fifth Avenue; a $100,000 six-story warehouse on Sixtieth Street, east of Broadway; a $140,000 six-story flat at 341 to 347 West Forty-fifth Street, and a $150,000 twelve-story loft on Thirty-eighth Street.

Brooklyn, N. Y., is contemplating a public library for the Prospect Park Plaza which will cost in the neighborhood of $600,000.

Building Trades Wages for 1916

We have received from Roswell D. Tompkins, secretary of the United Board of Business Agents of the Building Trades of the Borough of Manhattan and vicinity, New York, the prevailing rate of wages in various branches of the building trades for 1915. This schedule is based on 8 hr. work per day, except on Saturday, when work in the building trades ceases at noon.

*Asbestos workers, boiler felters, pipe coverers, insulators	$4.75
*Asbestos workers' helpers	3.00
Blue stone cutters, flaggers, bridge and curb setters	4.50
Blue stone cutters' helpers	3.00
Bricklayers	6.00
Bricklayers' helpers	3.00
*Carpenters and framers	5.00
*Cabinet makers	5.00
*Cement and concrete masons	5.00
*Cement, concrete and asphalt laborers	3.00
Derrickmen and riggers	4.00
*Decorators and gilders	4.50
Decorative art glass workers	5.00
Elevator constructors	5.28
Elevator constructors' helpers	3.40
*Electrical workers	4.80
*Electricians' helpers	2.20
*Electrical fixture workers	4.80
Engineers, stationary	4.50
Engineers, portable hoisting, etc., $30.25 weekly; by the day	6.00
Engineers on boilers, pumps or pile driving machines	$30.00 weekly
Engineers on all excavating, broken time by the day $6.00	$30.00 weekly
*Framers	5.00
Granite cutters	5.00
Glaziers	3.50
House shorers, movers and sheath pilers	3.75
House shorers' helpers	2.65
Housesmiths, bridgemen and structural ironworkers	5.30
*Ironworkers, bronze, metal furniture and metal trim workers	5.30
*Ironworkers' helpers	3.50
Ironworkers' apprentices	3.00
Metallic lathers	5.50
Marble cutters and setters	5.50
Marble carvers	6.00
Marble polishers	4.40
Marble sawyers	4.68
Marble bed rubbers	4.95
Marble cutters' helpers	3.25
Rigging and crane operators	3.75
*Mosaic workers	4.50
*Mosaic workers' helpers	3.00
Machine stone workers	4.50
Machinists of all description	5.50
*Paper hangers	Price list
Plate and sheet glass glaziers	3.50
Plasterers, plain and ornamental	6.00
Plasterer modelers	$30.00 to $100.00 weekly
Plasterers' helpers (after May 1, $3.50)	3.25
*Plumbers and gas fitters	5.50
*Painters	4.00
*Painter-decorator, painter-striper, painter-gilder	4.50
*Painter-letterer, painter-grainer	4.50
Riggers on machinery, dynamos, boilers, etc.	4.00
*Roofers, tar, felt, composition, damp and waterproofers	4.25
Rockmen and excavators	2.80
Rock drillers and tool sharpeners, open work, $3.68; tunnel	3.75
Sheet metal workers, coppersmiths, tinsmiths, metal roofers	5.00
Slate and tile roofers	5.50
Steam, hot water and general pipe fitters	5.50
Steam fitters' helpers	3.00
Tile layers (after Jan. 1, 1917, $6.00)	5.50
Tile layers' helpers	3.25
*Varnishers	4.00
Wood lathers	6.40
Wood carvers and modelers	5.00

*Subject to change.

Compensation for a practical foreman ranges from fifty cents to one dollar per day over and above schedule as shown. All recognized legal holidays and Sundays to be figured at "double time."

Buildings for San Francisco Presidio

Plans have just been received at San Francisco Army headquarters for twenty sets of new quarters for line and field officers, to be built on the Presidio reservation, west of the Exposition grounds. The new quarters will be strictly fireproof, provision being made for either concrete, tile or brick construction. Attention was called forcibly to the need for better buildings at the Presidio several months ago, when a fire in one of the old officers' homes caused the death of the family of a General.

New Publications

House Wiring. By Thomas W. Poppe. 125 pages. Size 4 x 7 in. Illustrated with Original Engravings. Bound in flexible cloth. Published by Norman W. Henley Publishing Co. Price 50c.

This is a practical little work of handy pocket size, now in its second edition. It is primarily intended for persons who are desirous of obtaining a practical knowledge of the installation of electric lighting systems, and the matter is presented in a clear, non-technical manner. The examples are of a practical nature, the author aiming to convey his knowledge in as few words as possible consistent with clarity. The work treats of the wiring of both finished and unfinished buildings, showing the three- and four-way circuits. Bell and annunciator wiring, burglar alarms and appliances constitute separate chapters in connection with which wet and dry batteries are treated. Interesting information is presented concerning the several conduit systems, plans and layout of electrical work, wiring and switch diagrams, etc. The installations described are in accordance with the rulings of the National Board of Fire Underwriters.

The Law of Architecture and Building. By Clinton H. Blake, Jr. 314 pages. Size 6 x 9 in. Bound in law canvas. Published by the William T. Comstock Co. Price $3.00.

The architect many know how to design a building and the builder may know how to erect it, but when it is necessary for either one of them to know just what are his rights, he is more or less at a disadvantage as to the methods of procedure. Many an architect and builder has suffered monetary loss because of ignorance of his rights and the uncertainty of his case often impels him to submit for fear of becoming worse involved. The work under review is intended to show the exact status of the builder in relation to the architect, the architect in relation to the builder, and the relation of both to the owner, together with the extent of the liabilities of each. A number of actual cases and standard legal forms and contracts contribute to a complete, yet simple, exposition of the laws governing contractors and architects.

Handwork in Wood. By William Noyes. 231 pages. Size 6 x 9 in. 304 illustrations. Bound in cloth. Published by the Manual Arts Press. Price $2.00.

This book, now in its fifth edition, is by a member of the faculty of Teachers College, Columbia University, and is intended primarily for teachers of woodwork, the author's experience well fitting him to make his ideas of interest to instructors. Professional and amateur workers in wood will also find much within its covers to clear up many points which may have been somewhat obscure to them. The story of the log is well told, the author taking his readers through the details of logging, then giving them a glimpse of the sawmill and ends up his preliminary three chapters with a section devoted to seasoning. He then devotes about seventy-five pages to the uses of various kinds of hand tools for working wood.

The latter part of the book is devoted to explanations of "Wood Fastenings," "Common Joints," "Types of Wooden Structure," "Principles of Joinery," "Wood Finishing," etc.

Well executed photographic views and drawings illustrate the stages of construction and the necessary machinery to turn the raw log into a highly finished product.

The Book of Thrift. By T. D. MacGregor. 349 pages. Size 5 x 7½. Bound in cloth. Published by Funk & Wagnalls Co. Price $2.00.

There are many books written on how to make and save money, but very few touch on the subject of thrift. The author explains just what thrift is and tells of the enormous waste of the vast resources of our country. He shows how this waste is carried into the homes and business of the majority of our population.

The ambitious young carpenter or builder may learn from this work many a practical hint which perhaps may be just the idea needed to turn the balance in his favor. He is told how to secure a desired education and how to start in business. It is pointed out to him how to secure the capital and credit for his business career: how to keep his money after he has made it, and indeed, the careful reader will find a helpful array of inspiring information which may well prove to be of practical money value to him.

Wiring of Finished Buildings. By Terrell Croft. 275 pages. Size 5½ x 8½ in. Illustrated with 205 diagrams, etc. Bound in cloth. Published by McGraw-Hill Book Co., Inc. Price $2.00.

It has been estimated that only 8 per cent of the houses in this country have been wired for electricity, naturally, the bulk of the wiring has been done in the larger cities, while the country sections have been sadly neglected. In many localities there is no electrician handy and the builder is often called upon to do the work or at least superintend its installation. Even if not desirous of doing the work himself, he naturally wants to be sufficiently familiar with the subject of house wiring to arrange the details, so as to enable the wiring to be easily and efficiently done. The book is a practical treatise on the subject indicated by the title. Methods of wiring, the planning of installations, the necessary tools and their uses and fixtures are described so that the builder can make a good job if he is called upon to do the work.

The general contract for the erection of the 1000-room hotel which the Pennsylvania Railroad is about erecting on the Seventh Avenue block-front, facing its terminal, New York City, has been secured by the George A. Fuller Company. The plans are being prepared by McKim, Mead & White, the well-known architects of the city.

Brief Review of the Building Situation

Building Operations for March in 126 Cities Show an Increase of 15.27 Per Cent Over March, 1915

NEW construction work at the present time is making comparison with a period a year ago when the country was emerging from the extreme depression growing out of the European War, and the gain therefore for March, 1916, is not as striking as were the two previous months, although reports at hand from 126 cities show building operations to be larger by 15.27 per cent than they were in March, 1915.

Taking the Eastern section of the country, from which reports are at hand from forty-seven cities, there are thirty showing a decrease and seventeen an increase as compared with March last year, with a resultant gain of 4.6 per cent. The accompanying table shows the relative activity prevailing in the various cities.

CITIES OF EASTERN STATES

	March, 1916	March, 1915
Albany	$199,090	$342,855
Allentown	100,310	127,780
Altoona	21,999	68,528
Bayonne	42,440	39,747
Binghamton	179,939	138,878
Boston	3,967,000	4,719,000
Brockton	44,285	186,008
Buffalo	899,000	830,000
East Orange	60,018	86,732
Elizabeth	118,723	96,502
Erie	218,799	296,966
Harrisburg	158,668	152,750
Hartford	853,305	706,237
Haverhill	25,700	87,250
Hoboken	6,036	47,450
Holyoke	118,950	24,675
Irvington	56,894	79,360
Jersey City	333,123	657,135
Lawrence	300,405	288,880
Manchester	105,605	83,080
Montclair	51,702	106,828
Newark	783,790	643,392
New Bedford	495,625	587,775
New Haven	520,560	825,470
New York:		
Manhattan	8,580,439	4,965,380
Bronx	2,285,938	2,668,112
Brooklyn	4,250,128	4,296,815
Queens	2,717,144	1,906,152
Richmond	206,229	245,492
Niagara Falls	309,062	38,450
Orange	51,903	86,732
Passaic	94,106	288,360
Paterson	107,268	76,973
Philadelphia	4,590,730	5,388,265
Pittsburgh	1,767,612	1,006,997
Portland, Me.	110,525	161,750
Reading	48,925	164,350
Rochester	596,243	1,000,000
Schenectady	61,860	81,336
Scranton	40,490	102,124
Springfield	560,568	570,588
Syracuse	177,745	520,533
Trenton	235,504	192,868
Troy	35,375	68,106
Utica	37,925	94,855
Wilkes-Barre	173,255	257,752
Worcester	780,130	353,360

From the middle section of the country reports from thirty-eight cities show an increase over March last year of 18.14 per cent, construction work being especially active in Chicago, Detroit, Kansas City, St. Louis, St. Paul, Sioux City and Toledo, while some of the more important cities reporting a shrinkage in new work planned are Cincinnati, Cleveland and Milwaukee.

CITIES IN MIDDLE STATES

	March, 1916	March, 1915
Akron	$524,715	$437,605
Cedar Rapids	95,000	152,000
Canton	529,200	189,250
Chicago	11,477,100	7,403,750
Cincinnati	948,500	1,356,124
Cleveland	1,838,465	4,022,035
Columbus	868,938	519,200
Davenport	96,084	73,865
Dayton	356,240	112,465
Des Moines	400,144	119,365
Detroit	3,677,785	2,839,490
Duluth	237,595	159,125
East St. Louis	30,292	80,955
Evansville	139,490	402,327
Fort Wayne	115,425	254,290

CITIES IN MIDDLE STATES (Continued)

	March, 1916	March, 1915
Grand Rapids	617,020	260,429
Indianapolis	906,268	889,349
Kansas City, Mo.	1,226,619	848,595
Kansas City, Kan.	55,460	165,285
Lima	216,925	150,325
Lincoln	153,040	97,450
Milwaukee	690,798	942,921
Omaha	346,805	332,860
Peoria	151,170	159,175
Quincy	87,695	185,402
Saginaw	10,940	81,215
St. Joseph	214,303	50,903
St. Louis	1,761,781	1,268,878
St. Paul	1,064,452	822,624
Sioux City	552,680	167,675
South Bend	12,529	43,547
Springfield	670,785	88,920
Superior, Wis.	18,255	67,235
Terre Haute	48,235	57,535
Toledo	1,022,495	763,258
Topeka	51,440	73,500
Wichita, Kan.	145,950	27,900
Youngstown	176,313	148,295

In the Southern section of the country the increased activity as compared with March last year is especially noticeable, twenty-four cities reporting show eighteen increases and six decreases with a resultant gain of 38.16 per cent. This is due in large measure to the greater amount of work planned in Atlanta, Baltimore, Dallas (Tex.), Nashville, Norfolk (Va.), Richmond and Washington.

CITIES IN SOUTHERN STATES

	March, 1916	March, 1915
Atlanta	$458,401	$267,417
Baltimore	1,305,111	882,701
Birmingham	188,426	154,555
Chattanooga	184,015	40,865
Corpus Christi	18,625	17,423
Dallas, Tex.	452,891	147,690
Fort Worth	202,992	125,930
Huntington	68,975	390,800
Jacksonville	66,100	259,500
Louisville	576,730	518,100
Macon	42,968	84,351
Memphis	306,060	345,785
Miami	96,700	89,200
Montgomery	47,849	11,765
Nashville	352,884	190,570
New Orleans	248,936	194,385
Norfolk, Va.	1,276,139	180,694
Richmond	593,720	284,826
Savannah	57,300	132,700
San Antonio	199,470	95,500
Shreveport	62,570	47,479
Tampa	116,245	116,387
Washington	1,579,301	714,826
Winston Salem	171,000	70,452

Coming now to the extreme Western section of the country, and including territory west of Denver, the volume of building operations is 28.19 per cent as compared with March a year ago. The increased activity was especially noticeable in Los Angeles, Oakland, Pasadena, San Francisco, Seattle and Spokane.

CITIES IN EXTREME WESTERN STATES

	March, 1916	March, 1915
Berkeley, Cal.	$160,000	$140,950
Colorado Springs	27,617	22,700
Denver	386,390	181,130
Los Angeles	1,416,535	1,124,063
Oakland	910,680	500,373
Pasadena	175,132	79,373
Portland, Ore.	420,560	503,755
Pueblo	40,454	8,360
Sacramento	109,497	148,725
Salt Lake City	314,550	209,385
San Diego	203,312	94,685
San Francisco	2,512,328	1,405,038
San Jose	53,635	97,971
Seattle	735,785	689,675
Spokane	246,059	102,660
Stockton	88,325	140,814
Tacoma	168,122	192,450

For the first quarter of the present year the increase over the corresponding three months of last year is most encouraging, and the outlook for 1916 is at least for an average amount of construction work.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Important Purchase of Metal Lath Interests

Under the above title we presented in our last issue brief announcement of the fact that the Sykes Metal Lath and Roofing Company, Warren, Ohio, had purchased the metal lath department of the Brier Hill Steel Company at Youngstown, Ohio, which was formerly operated under the name of the Garry Iron and Steel Company, Niles, Ohio. Supplementing this announcement we learn that the increased demand for Sykes expanded cup lath "self-furring," has compelled the company to make arrangements for materially increasing its manufacturing equipment and it is firmly believed that with the Garry plant it will be able to give its customers better service as well as the benefit of a very complete line of metal lath. The company is now able to furnish the following:

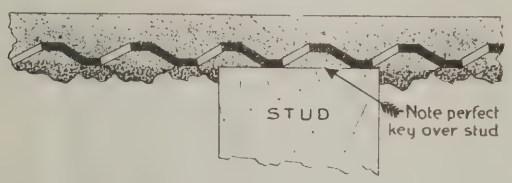


Fig. 1—Horizontal Section of Wall or Partition Showing Use of Sykes Expanded Cup Lath

"A" grade Cleveland Expanded Metal Lath
"B" grade Cleveland Expanded Metal Lath
Garry Metal Lath
Diamond Mesh Metal Lath
Sykes Expanded Cup Lath "Self-Furring"
Sykes Trough Sheet Lath

In addition to the above the company will turn out corner bead, wall ties, etc., and place itself in a position to promptly meet the wants of its rapidly increasing trade. In Fig. 1 we present a cross-section of a plastered wall or partition showing the use of Sykes expanded cup lath which is said to give greater durability by giving more weight. By its peculiar formation it reinforces the wall, as clearly indicated in the cut, and "becomes a firmly imbedded backbone of strength."

Architects' Specifications for Carey Building Materials

An attractive publication bearing the above title has been prepared for distribution among architects and builders by the Philip Carey Co., 1020 Wayne Avenue, Lockland, Cincinnati, Ohio. An interesting feature in connection with it is the statement that it has been compiled in conformity with the specifications of the American Institute of Architects and is therefore a valuable reference book for architects, engineers, contractors and prospective builders. The several Carey products are illustrated and instructions given for applying them. Reference is made to Carey Flexible Cement Roofing, which is built of a foundation of wool felt with a heavy body of asphalt cement above; Carey Asfaltslate Shingles, built on a base of heavy wool felt, saturated and coated with a waterproof asphalt compound, and finished with a heavy coating of crushed slate in permanent natural colors, red or green; Carey Ceil-Board, made of three sheets of chip stock bound together with Gilsonite asphalt cement and sized on both surfaces of the finished board with paraffine and furnished in six different finishes; Carey Rubber Roofings, having the surfacing materials embedded in the asphalt top coating while it is still hot, and the sheets then put through heavy rollers; Carey Elastite, used in concrete walls, piers, sidewalks and all construction work where it is necessary to provide for expansion of materials; Carey Fibrewove Insulating Paper, used as a paper lining for buildings, and said to be moisture-proof, vermin-proof, acid-proof, decay-proof, temperature retarding and odorless, and Carey Percoproof, a damp-proofing compound made of a fusion of waterproof gums worked into a uniform mass without pores. Carey Magnesia and Asbestos Insulating Products, as given in the catalog, constitute a basis for the proper class of insulation to be used for certain fundamental conditions. The engineering department of the company is ready to give any assistance possible in the solving of insulating problems.

Change of Name of Sandusky Portland Cement Co.

The corporate title of The Sandusky Portland Cement Company, Cleveland, Ohio, has recently been changed to that of "The Sandusky Cement Company," the officers and directors in the new company being the same as those of the old concern. There will be no other changes of any kind whatever, the business of the company being carried on as formerly, but the trade is requested to make special note of the new title and make use of the same in all correspondence.

The "Grand" Concrete and Mortar Mixer

There are many building contractors who, having occasion to make use of both a concrete and mortar mixer, but whose work will not always justify the purchase of two separate machines, are likely to be interested in the combination machine illustrated in Fig. 2, which is particularly adapted to meeting their

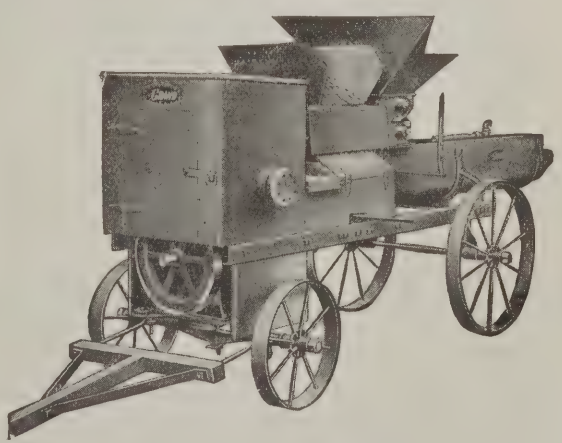


Fig. 2—General View of the "Grand" Concrete and Mortar Mixer

requirements. The combination machine which is being offered under the name "Grand," has a capacity when operated as a concrete mixer of 7 to 8 cu. yd. of concrete per hour, and when operated as a mortar mixer will supply from forty to fifty masons. The construction is such that the machine can be quickly changed to mix either concrete or mortar, according to requirements. The "Grand" mixer is rigidly built, is mounted

upon steel wheels 20 x 30 in. in diameter, with 3½-in. thread, and is readily portable. The mixing trough contains twenty-six paddles, one-half of which are set at reverse angles in order to insure thorough mixing and tempering. The discharge end of the mixing trough is equipped with a self-locking grate that holds the mortar until it is thoroughly mixed. The machine is equipped with high-grade tub top and water-cooled 4-hp. gasoline engine, which it is claimed is ample to operate it at its maximum capacity. The combination mixer here shown is made by the Hall-Holmes Mfg. Co., Jackson, Mich., which has issued an attractive folder relating to the machine and a copy of which can be obtained by any reader of THE BUILDING AGE upon application to the address given.

Berger's Exhibit at Complete Building Show

We take pleasure in presenting herewith a photographic reproduction of the display made at the recent Complete Building Show in Cleveland by the Berger Mfg. Co., Canton, Ohio. This exhibit was unusually interesting and instructive inasmuch as it showed the company's various products installed in a practical way, thus enabling architects, builders, contractors, engineers and others to readily understand their uses and applications. Referring to the picture, Fig. 3, it will be seen that in the foreground at the left is displayed Berger's metal lath attached to metal lumber studs and partially plastered; also Berger's "Raydiant" sidewalk and vault light construction, clearly indicating the form used as a base, the reinforcing rods and the malleable-coated Tanex glass. One-half of it is cemented to show a finished installation and the other half the detail of construction. In the foreground at the right are shown Berger's metal lath, corner beads, and base screed. The corner beads, as is well known, are used to protect corners of plastered walls from cracking, chipping and breaking, while the base screed offers a permanent ground for the plaster above and the cement base below. Directly above these products are Berger's pressed steel cores for displacing concrete and forming concrete joists for long spans in light or heavy construction; rib-trus and ferro-lithic reinforcing plates used for floors, roofs, partitions and side walls for all classes of buildings. In the background of the picture is shown the metal lumber floor construction which was used in the first floor of the $6000 prize house given away by the management of the Complete Building Show. In the rear of the booth is shown an I-joist used in the fire, load and water test made by Columbia University, New York City, some time ago for the benefit of the Building Bureaus of the city.

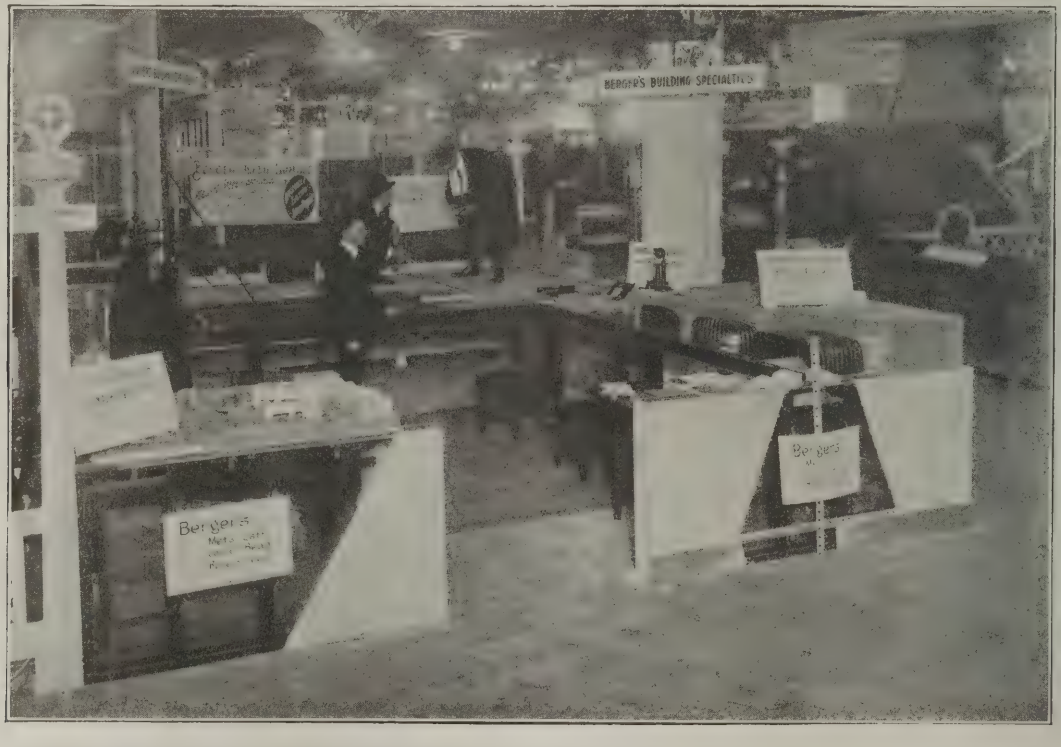


Fig. 3—Photographic View of Exhibit of Berger Mfg. Co. at Recent Complete Building Show in Cleveland

Ransome Mixer Company, Inc.

A. W. Ransome, for fourteen years vice president and general manager of the Ransome Concrete Machinery Company of Dunellen, N. J., having severed his connection with the latter company, has organized the Ransome Mixer Company, Inc., with headquarters at 35 West Thirty-ninth Street, New York. This company will manufacture a line of concrete mixers and will also handle a line of contractors' machinery as well as the Insley Line of Gravity Plants.

Reynolds Shingle Bulletin

In the March issue of the "Bulletin" of the H. M. Reynolds Asphalt Shingle Co., Grand Rapids, Mich., there is a most interesting article on "The Felt Situation," which explains, among other things, the reason for the increasing cost of asphalt shingles. "The foundation of the roofing material," it states, "was at first an experimental problem. Papers of various kinds were tried out but they were soon discarded because it was found impossible to properly saturate them. After a long series of experiments, manufacturers adopted a felt made of rags as being best suited to their demands. The rag felt possessed greater tensile strength and absorption properties, the real merit of asphalt roofing depending upon proper felt saturation so that it might be thoroughly impervious to water. No substitute has been found for felt, so that increased felt-cost necessarily means increased shingle-cost. The war has shut off about 40 per cent of the rag supply and an increased demand, due to the substitution of felt for burlap, has made the price of felt increase from about $45 at the beginning of 1915 to a March, 1916, quotation of $85 per ton, delivered at the factory. This means an increased manufacturing cost of 80 cents per square for asphalt shingles in a year's time." The Bulletin is illustrated with halftones showing Reynolds shingles in use on various houses and garages. It is stated that exhaustive tests have been made with Reynolds shingles

(*Continued on page 82*)

"Im on Main Street Now!"



"Neponset put me there; my roofing business got so big that I had to move. Neponset Shingles have made me—they will make you, too, if you become the Neponset Man in your town.

NEPONSET SHINGLES

"The architects like them, the customers like them. It does me good to walk around and look at those fine looking Neponset roofs—my roofs—and to know that several thicknesses of Paroid weather-proof roofing are protecting my customers from storm, sun and fire. Neponset Shingles are made in red and gray.

"Send the coupon right now, while Neponset is on your mind."

BIRD & SON, Department, B

Established 1795 EAST WALPOLE, MASS.

BIRD NEPONSET PRODUCTS



NEPONSET WALL BOARD
For Walls and Ceilings

in the beautiful new Quartered Oak finish need only to be shown to get you lots of wainscoting jobs.

It is waterproof—can be cleaned with a damp cloth—it is six-ply and rigid—won't warp.

It has hundreds of uses in business as well as at home.

Write for booklet.

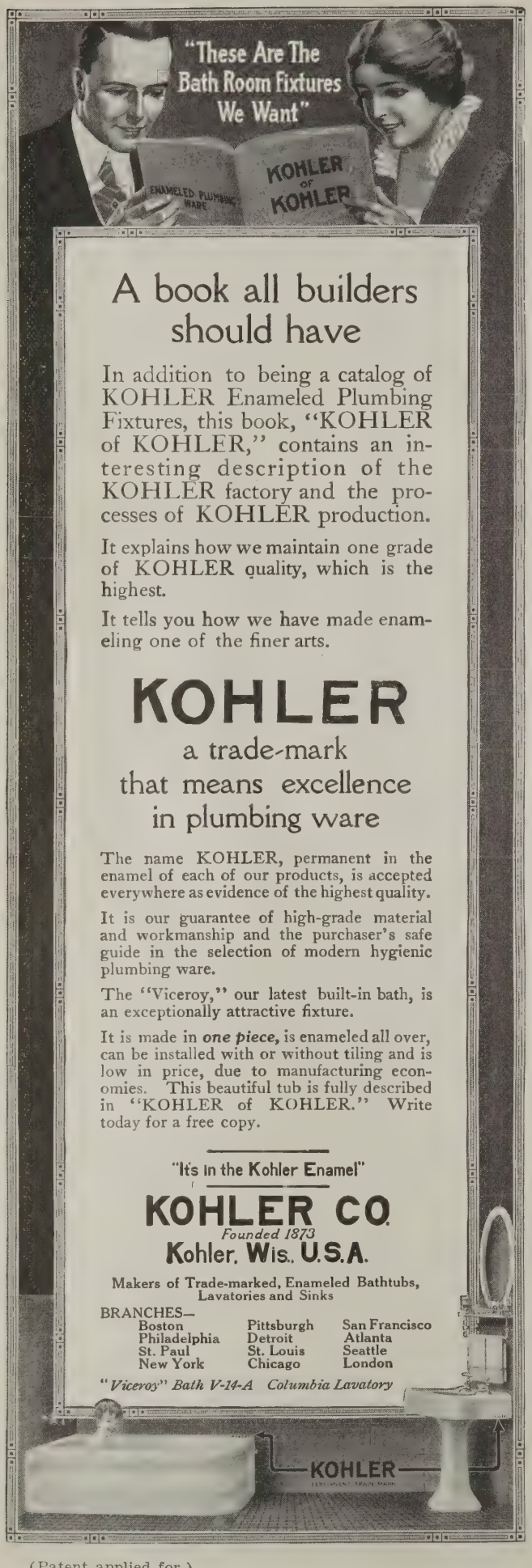
BIRD & SON, Department B, East Walpole, Mass.

Please send me information and samples of Neponset Shingles and Neponset Wall Board. Also a copy of your book, "Repairing and Building."
This request does not put me under any obligations whatsoever.

Name .....

Address .....

Send This Coupon Today



(Patent applied for.)

by the Board of Fire Insurance Underwriters, the result being that the Board has rated the shingles in the same classification as slate or tile.

Empire Pipeless System of House Warming

Much attention is at present being given to the subject of pipeless house warming, and the heater shown in broken view in Fig. 4 is therefore likely to interest many of our readers. It is known as the "Empire Pipeless Furnace," and is so constructed that it may be set up in high or low cellars as may be preferred. A combination duplex grating register is placed in the room directly over the heater, this being the only register required. The furnace has two casings of heavy galvanized steel, the inner one being thoroughly insulated with heavy sheet iron and asbestos paper. The cold air from the room passes into the outer section of the register, continuing down through the opening between the inner and outer casing, and then under the inner casing, where it comes in contact with the heat from the furnace. As it becomes warmed it rises and passes out into the room through the round opening in the center of the register. This means a constant flow of air through the rooms, due to the fact that warm air rises and cold air falls. It is claimed that all floors are maintained at a nearly uniform



Fig. 4—Broken View of the "Empire" Pipeless Heater

temperature throughout the house. The Co-operative Foundry Co., Rochester, N. Y., states that the double casing keeps the cellar cool, the outer casing being kept chilled by the descending cold air. The fuel may be hard or soft coal, wood or natural gas, the company furnishing gas rings when desired. Other features are an unusually deep and roomy ash pit, deep cup joints, thoroughly cemented and gas tight, and grate so made that each bar of it can be taken out separately. The fire pot is either one-piece or two-piece, and is heavy and ribbed. There are hot water connections and a feed door of ample size. The patterns are claimed to be perfectly fitted, consequently when setting up the furnace no difficulty is experienced in mounting the different sections into a perfect, gas-tight heater.

Garage Door Equipment

An interesting catalog bearing the above title and sent out by the Richards-Wilcox Mfg. Co., Aurora, Ill., contains two instructive articles giving the solution of problems which may have often puzzled the architect or builder. These are entitled "The Garage Door Problem" and "Locking Garage Doors." The first treats especially of the use of sliding doors in the small one-car garages which are so popular. No matter how large the door opening may be in proportion to the building, a sliding door, it is stated, can be satisfactorily fitted. The solution is simple, consisting of an arrangement of

(*Continued on page 84*)

5000 Building Bargain Book—156 Pages FREE!

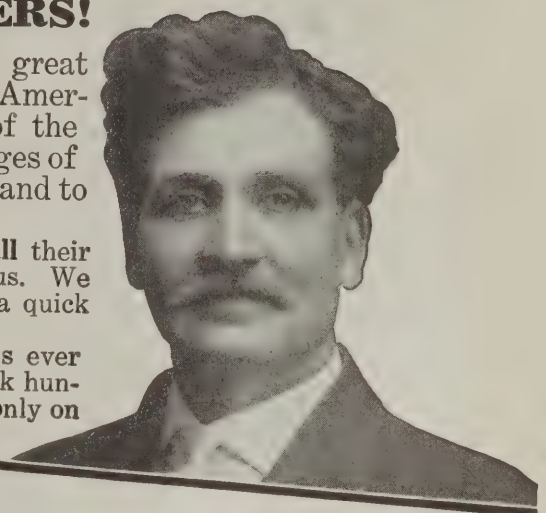
TO CONTRACTORS AND BUILDERS!

SEND us the coupon **today.** We want to place this great illustrated book in the hands of **every** contractor in America. We want to send it to **you.** Thousands of the most successful contractors and carpenters, expert judges of values, keep our great catalog and valuable books on hand to guide them in **buying** and **estimating.**

Ten thousand contractors and carpenters buy practically **all** their building materials, lumber, hardware, paints and the like of us. We offer **you** the same **wholesale-to-builder** prices, the same extra quick delivery.

Our stocks are so complete, **always,** that no building job is ever held up because of a delay on a few items. We carry in stock hundreds and hundreds of bargains that can be bought elsewhere only on **special order** at high prices.

The facts are that the Gordon-Van Tine Co., offers the **biggest, broadest, finest stock** of quality building material **on earth.** Quality for quality our **prices** are the **lowest.** Our **guarantee** assures you of **satisfaction or your money back.** We ship to you **anywhere!**



Galesburg, Illinois
October 15, 1915

Gordon-Van Tine Company,
Davenport, Iowa

Dear Sirs:—

I am taking a breath at the height of a busy fall building season to thank you for the fine way in which you have gotten my material to me. My success this season owes a great deal to the promptness with which you got my material on the job and the uniformly high quality of everything sent me.

In thanking you in this way, I merely wish to tell you that I appreciate being treated right and that is certainly what you have done throughout. An occasional error or an occasional delay would creep in now and then, but I will say that you people never hesitated to correct these things regardless of trouble or expense.

Indications are that the coming spring will be a big one in this vicinity and I am looking forward to being again helped by your prompt deliveries and dependable material. If we continue to work together as we have in the past, I am sure that it will pay us both.

Accept my kindest regards.

Yours very truly,
Signed
E. H. KEGLEY

Doors

All styles and sizes. Quality guaranteed. Hundreds of special designs ready for immediate shipment. See pages 12 to 19 in Catalog. As low as $1.07.



Newels

Up-to-date patterns. Kiln dried stock. Good carvings—not composition. Specially packed. Page 78 to 79 in Catalog. From $2.57 up.



Wall Board

Cheaper than lath or plaster. Clean, dustless, warm, dry, strong. Comes ready to apply. See pages 116 to 119 of Catalog. Per 100 sq. ft. only $2.10.





Paints

"Quality" Paints backed by our ironclad guarantee. 28 colors. (See page 98 of Catalog for complete chart). In 25 gal. ½ barrels at $1.10 per gal.; 5 gal. kits, $1.17 per gal.; 1 gal. cans $1.22 per can; ½ gal. cans, 65c per can; 1 qt. cans, per can 35c.

Windows

Plain and fancy windows; all sizes; all prices—Plain rail, glazed 76c up. See catalog, pages 42 to 54. Check rail windows as low as 70c.



Porch Columns

Colonial designs, built-up lock joint columns. Cypress. Protected for shipping. See page 75 of Catalog—Prices range from $4.75 to as low as $1.50.



Stair Work

Material for all kinds of stair work in stock. Prompt delivery. See Catalog pages 78 to 81. A complete flight of stairs as low as $23.93.



Glass

Wholesale prices. All grades, all sizes any quantity. See page 40 of catalog. Just as an instance—8 x 10 inches per light, 3½c. 24 x 28 inches, 32½c.



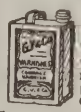
Cupboard Doors

In Yellow Pine or Oak. Leaded glass. Many designs—See page 20 of catalog. As low as 90c.



Floor Varnishes

Resists heel marks! Won't mar or scratch white; dries hard over night. Can be rubbed. See pages 99 to 101 in Catalog. Quarts **50c,** Gals. **$1.75.**



Shingles

Washington Red Cedar—Official grading rules—see page 91 of Catalog. Extra clears, 5 to 2, per 1000, $3.45. Extra Star A Star, 6 to 2, per 1000 $2.95.



Hardware

Quality highest, backed by our ironclad guarantee. Everything—See pages 124 to 140 of Catalog. Front door locks as low as $2.50



Lath

See page 91 of Catalog. No. 1, Northern 4 ft. lath, per 1000, $4.60.
No. 1, Northern 32 in. lath, per 1000, $2.50.



Jap-a-Top Roofing

Jap-a-Top Slate Surfaced Shingles. In Red or Green. Permanent and beautiful. Also roll roofings; straight or diamond point edge. See colored insert in Catalog. Jap-a-Top Shingles, per sq. $4.75.



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Please send Free the books checked.

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- ☐ Summer Cottages

Please send me specific information about.....

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Mention here articles in which you are most interested.

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Occupation.....

Why Have Heating Pipes in Your Partitions?



Now that you come to think of it, heating pipes *are* an awful hitch on construction work, aren't they?

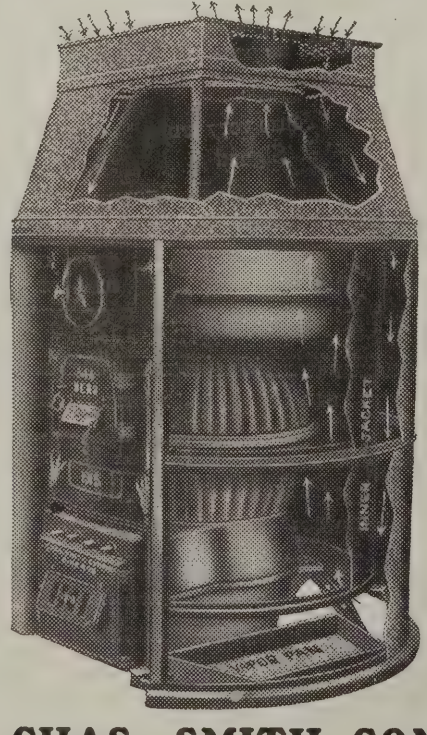
But you don't *have* to hold up your mason and paper-hanger until the furnace man gets on the job. You don't *have* to take a chance of over-running the contract!

You can disregard the furnace proposition entirely until the house is completed. The Empire Pipeless Furnace does away with all partition work. May we tell you how it works?

CO-OPERATIVE FOUNDRY CO.

505 S. Clinton St. Chicago — Rochester, N. Y.

THE HERO PIPELESS FURNACE



Easy to Install

Also Manufacturers of

The Hero Lines

of Basement Furnaces, Hot Water Heaters and School Room Heaters.

Write for Prices and Catalog Also Agency Proposition

CHAS. SMITH COMPANY

57 W. Lake St., Chicago, Ill.

"R-W Trolley Right Angle Door Hangers" so disposed as to allow the jamb side of the door to swing along the inside of the garage wall until the other side comes flush against the wall. The door is then flat against the side wall at right angles to its position when closed. Altogether, twenty-five different door schemes are presented accompanied by twenty-eight explanatory illustrations. The second article aims to show how all door-locking problems can be solved, eighteen illustrations picturing the various methods. Prices, sizes, etc., of these doors and locks are contained elsewhere in the catalog. There is also described an "R-W Stewart Electric Door Opener and Closer," which consists of a three-button system—one button to open the door, another button to close it and a third button to stop the door at any desired place. The control buttons can be put in any part of the building, the whole system being readily installed by any electrician.

Modern Equipment an Important Factor of a Contractor's Success

Much might be said regarding the value of modern equipment to the contractor and builder who undertakes a wide variety of work in town and country, and the matter may possibly be summed up as follows: First, that it enables the contractor to undertake certain work that would otherwise have to be refused if up-to-date machinery were not used; secondly, that the purchase of good, substantial machinery is an investment that will produce dividends in the reduction of construction costs, the progress of the work may be facilitated, insuring the owner of a first class building that will stand

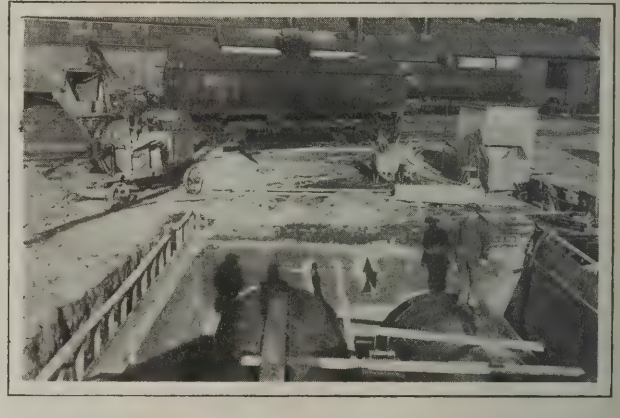


Fig. 5—Building Operation Showing Oshkosh Concrete Mixer at Work

as a monument to the contractor's ability and pave the way to more profitable business relations with the architect and owner. An exceptionally interesting instance of a progressive contractor and builder who does an annual business approximating $75,000 in a town of 50,000 population and vicinity is demonstrated in the experiences of the Du Boise Construction Company of Flint, Mich. Much of Mr. Du Boise's success can be traced to his foresightedness in purchasing the necessary equipment that has enabled him to carry to a successful conclusion contracts for all classes of structures. Mr. Du Boise uses a concrete mixer of a type made by the Oshkosh Mfg. Co., Oshkosh, Wis., as well as one of the same company's saw tables, several derricks made by the Sasgen Derrick Co., Chicago, Ill., an automatic pump for foundation work and other equipment. The president of this company was recently interviewed by a representative of THE BUILDING AGE, at which time he volunteered the following remarks:

"I can safely say that modern equipment has contributed much to the success of the Du Boise Construction Company. In recent years we have erected churches, schools, warehouses, hospitals and a variety of buildings that we felt confident we could execute to the owner's satisfaction at a reasonable figure. In regard to our mixer, the past two years has demonstrated its efficiency to such an extent that we find it indispensable. It has a daily capacity of about 80 cu. yds. when running, as near as possible, on a mix-a-minute basis. This enables us to go right ahead with the work and keep the men busy and is the means of facilitating

(*Continued on page* 86)

Your Transportation Department will be Respected by Customers and Competitors

THEY WILL NOTICE THE ABILITY of your Federals to take care of business in many places they had never dreamed were possible to reach.

THEY WILL APPRECIATE THE PROMPT SERVICE, THE QUICK DELIVERIES and large tonnage that your transportation department handles.

FOR INSTANCE—averaging 50.86 miles and delivering 19,858 pounds of material each day during February, 1½ Ton Federal Truck No. 3225 earned for itself the respect and admiration of all its competitors, and enthusiastic praise from its owners.

WE WILL GLADLY SEND YOU INTERESTING DATA concerning Federal Trucks in the building business. We also publish "Traffic News," a magazine on transportation which we will be glad to send you upon request.

Federal Motor Truck Company
Detroit, Michigan

1½, 2, and 3½ Ton Worm Drive Motor Trucks





The HESS Welded Steel Pipeless Furnace. No horizontal pipes nor air ducts in cellar.

Ever Get Stung?

with a furnace? Did the man tell you his was the only, only, **best** furnace—that it would heat you up to 80 in 40 below zero weather—on three tons a winter—and did he separate you from your dollars before you had a chance to test it; and then didn't you wish you had your money back?

We won't sting you. We don't want your money till you are satisfied with your furnace, **after a test.**

Here Are the Terms:

We will ship you a furnace, with all pipes, registers, etc., made to fit your house, first submitting complete plan for your approval. We will **prepay freight charges** to your station.

When the outfit arrives, check it up and pay your local banker the purchase price. He will hold it **till January first** subject to your test. You set up the equipment and use it and test it till that time. If it doesn't work according to our guarantee—if you think it isn't worth our price—or more—send it back (we pay freight both ways) and the banker will return your money. We send full plan and directions for setting, also all tools, if you need them.

There's no trick about this offer. It has been in force for years, and it means just a **square, straight deal,** direct between maker and user.

We make a splendid furnace—welded steel—gas and dust tight, economical, simple and all that. For separate pipes or the new **Pipeless** sort. We describe it fully in a 48-page book which we send free. Ask for one, and read it, before you buy anything else in this line. You'll buy comfort and save money.

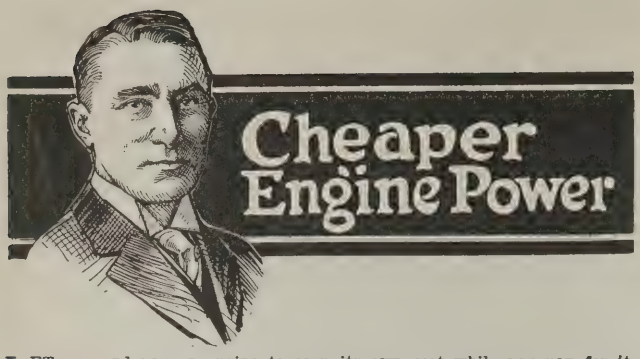
Special terms to contractors.



The HESS Welded Steel Furnace for Separate Pipes and Registers.

Hess Warming & Ventilating Co., 1201 Tacoma Bldg., Chicago, Illinois

Makers of White Steel Medicine Cabinets



LET me send you an engine to earn its own cost while you pay for it. **Easy to start; no cranking**; easy to understand and manage; and easy to pay for on any suitable, reasonable terms of payment, during a year. I have helped many thousands to own engines in this way, during my 29 years of engine building.

WITTE Engines

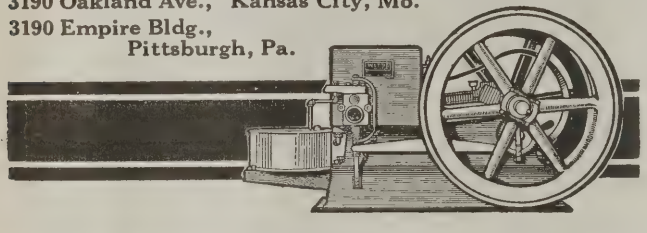
Gasoline, Kerosene and Gas

SEE THESE LOW PRICES: 2 H-P, $34.95; 3 H-P, $52.45; 4 H-P, $69.75; 6 H-P, $97.75; 8 H-P, $139.65; 12 H-P, $197.00; 16 H-P, $279.70; 22 H-P, $359.80. (*F. O. B. Factory.*) Portable Engines and Saw-Rig outfits proportionately low. **Guaranteed high quality**—as durable as superior design, best materials and workmanship can make.

Guaranteed 5 Years

Fine Book Free My book, "How to Judge Engines," will show you how to select the engine most suitable to your needs, and how easy it is to run a WITTE at any kind of work. Get my engine facts before you decide on any engine.

ED. H. WITTE, WITTE ENGINE WORKS
3190 Oakland Ave., Kansas City, Mo.
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Here's a PORTABLE Closet
Saves You Big Money on Every Job

Whether you're figuring on a building, on road construction, excavation, sewer or any other job—you can underbid competition every time and still make a better profit, if you own a

Kaustine
Portable Closet

Figure the big saving yourself: Every man wastes 10 minutes twice daily going to and from the inaccessible closet—that's 20 minutes daily, 8½ hours monthly (520 minutes); 20 men 2 months on a job lose 340 hours, and even at 25c per hour the waste of your money amounts to $85. On jobs requiring more men and more time your loss is proportionately bigger.

The Kaustine Portable Closet is always accessible, does away with the big loss of time. Keeps your men in better condition, because they won't delay relief. (Those delays make men sluggish—result in slower and inferior work.)

Kaustine, the powerful germ-killing chemical, keeps this system sanitary, healthy, clean and neat. Initial cost is low, upkeep low.

Write for full particulars, and state number of men employed.

Kaustine Co., Inc., Dept. B1 Buffalo, N. Y.
Also C. P. R. Building, Toronto, Ont.

the progress of the work. In other words, the work reflects considerable credit on the concrete mixer. Not long age we found it imperative to do some foundation work when the temperature was about 10 deg. below zero. It was for a large warehouse, and specifications called for a 14-ft. basement with an 18-in. wall. We poured the concrete at a temperature of 65 deg. and the work was completed inside of three days. The concrete was afterwards tested and found in satisfactory condition. We have just completed the building of a concrete oil tank vault as shown in Fig. 5. It has dimensions of 30 ft. long, 22 ft. wide and 14 ft. deep, being sufficiently large enough to accommodate two steel tanks that have a combined capacity to hold three cars of oil. The vault has a bottom that is 14 in. thick and will be covered by a reinforced concrete slab 12 in. thick. Each tank weighs 12,400 lbs. and was set in place by a Sasgen derrick having a 36-in. boom and a ⅝-in. cable. The concrete for the entire vault was poured in 6½ hours, about 60 cu. yds. in all. The Oshkosh saw table was purchased by us last July, and it is no exaggeration to state that it has more than paid for itself. Its portability and general efficiency is such that we could not afford to be without it. For example, last year we took a contract for some remodeling work on a schoolhouse and had permission from the authorities to use all the old lumber in the execution of the new work. The saw table was sent out to the job and it was worked to capacity. When we got through, all you could find was sawdust, literally speaking, for every piece of wood that could be used was disposed of in some manner. Without the saw table we could not have accomplished the results or have done identical work in the same time with inefficient equipment. We do a large volume of business annually because we are equipped to handle most any kind of a job that is likely to be projected in the city of Flint or in our immediate territory."

Two New Concrete Mixers

Two drum concrete mixers which have been accorded a very favorable reception by contractors and builders

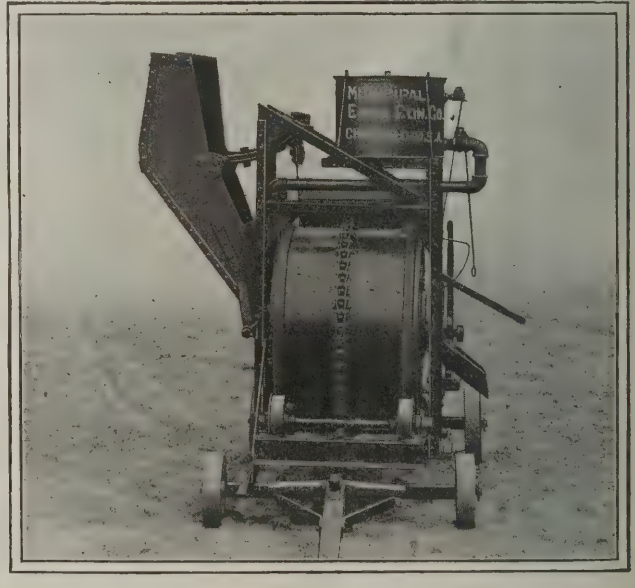


Fig. 6—General View of New Mixer Made by Municipal Engineering and Contracting Co.

have been placed on the market by the Municipal Engineering & Contracting Co., 609 Railway Exchange Building, Chicago, Ill. They are known as the No. 0 and No. 1, and have respective capacities of 4½ and 6 cu. ft. of mixed material, the quantities being based according to the wet batch rating of the National Association of Mixer Manufacturers. The construction throughout is steel riveted steel plates and shapes, with the exception of the racks and gears. All operations are controlled from a single position, connections both fixed and operating being of simple and strong construction. The company states that no sacrifice of strength and durability has been made in any part. The charging arrangement consists of a hinged funnel-

(*Continued on page* 88)



Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name .....

Occupation .....

City ..... State .....

Pullmanize Your Windows

ASK FOR PLAN of an arrangement we have evolved for dormer windows, triple windows and bay windows which has met with wide approval among architects. It effects a considerable saving in construction, cuts down millions to the minimum and in every way has given unqualified satisfaction.

Pullman All Steel Unit Sash Balances

used in this connection are fast supplanting cords and weights. They require only a small mortise, and as they have a uniform size face plate the mortise can be cut at the mill when the frames are made. All parts are in the casing—nothing can rub or interfere with the spring action. There is nothing to squeak, rattle, bang or stick. Once installed and it will never require contractors', builders' or architects' attention. There is in every Pullman Sash Balance satisfaction for owner and builder alike. Guaranteed for 10 years. Over five million in use.

'Way back in June, 1890, over twenty-five years ago, the General Hospital (Surgical Building), Rochester, N. Y., installed Pullman Unit Sash Balances. They report that these Balances are in fine working order today. Their noiseless operation appealed to them.

In the Wilsonia, a fine modern apartment in Rochester, Pullman Unit Sash Balances are used for all the windows. The windows are large and the service severe. The owner says: "They move as noiselessly and easily as though supported by an air cushion." He also reports a saving of about $1.00 per window through their use.

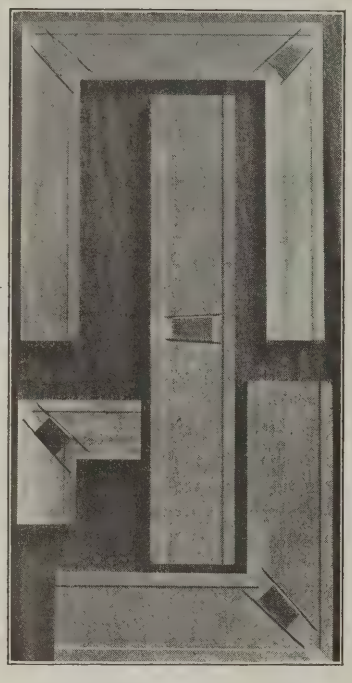


Send TODAY for our Complete Catalog.

Pullman Mfg. Company, 8 Industrial Street, Rochester, N. Y.

"Keystone Lock Joint Clamp"

Patent applied for



These clamps are made from high grade spring steel, with convex face and acute angled flanges, which engage corresponding grooves formed in backs of the parts to be joined together, as shown in illustration.

When driven in place, the clamps, owing to their compensating spring construction, exert a constant pressure on the edges so joined together, making a joint which remains tight under all changes of climate or temperature.

To secure the best results, specify and insist upon the use of the "Keystone Lock Joint Clamp" on all mitre trim joints.

We use the "Keystone Lock Joint Clamp" on all our erected trim without any additional cost to our Customers, giving them, as always, MAXIMUM VALUE AT MINIMUM COST.

HYDE-MURPHY COMPANY

Ridgway, Pa.

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FIREPLACE MATERIAL

Every Contractor



building fireplaces should know the advantages of the Stover Dome Dampers.

The rod extends out under the brick or tile so there is no interference after the Damper is first set. Wide flanges allow giving sides of Fireplace any angle desired. Cover will not slip out of position. Castings are extra strong. Made with or without angle for carrying brick. We make other styles.

Catalog No. 1550 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

Stover Mfg. Co.

747 East St.

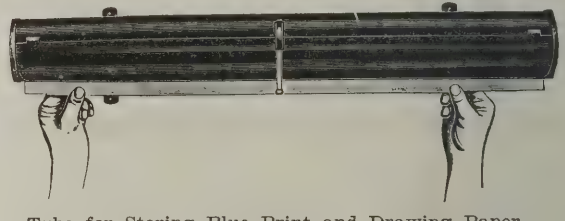
Freeport, Ill.

"SEND COUPON TODAY" Stover Mfg. Co., 747 East St., Freeport, Ill.
Send the undersigned information regarding your
Name.....
Business.....
Address.....
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shaped steel plate hopper which, when lowered, can be filled from the ground level by wheelbarrows. A simple cable hoist elevates the hopper for discharging into the drum. The discharging arrangement is a swinging chute operated by a hand lever. Any part of the batch, or the whole batch, may be discharged at one time by suitable manipulation of the swinging chute, and when mixing, the chute is completely removed from the possibility of catching and discharging portions of the batch. The No. 0 mixer is rated with a daily output of 50 cu. yds. when operated by a 3 hp. hopper-cooled gasoline engine. Specifications for this size call for a steel frame, steel axles and steel wheels. The size of the front wheels is 16 x 2½ in. and the rear wheels have dimensions of 20 x 2½ in. The drum is made of blue annealed steel and the heads are semi-steel. Chilled friction rollers are provided and a friction clutch is between the engine and the mixer. The No. 1 mixer is driven by a 4 hp. hopper-cooled gasoline engine and has a daily output of between 70 and 80 cu. yds. The size of the front wheels is 24 x 5 in. and rear wheels 36 x 5 in. The engine is covered with steel housing and there is a charging elevator and water tank. The elevating and discharge levers are operated from the discharge side of the machine. A view of one of the mixers is shown in Fig. 6. Mixers are also made with capacities of 7½ and 10 cu. ft. A special catalog may be had on application to the company.

Tube for Storing Blue Print and Drawing Paper

A device which will at once appeal to the architect, the draftsman, the builder and the engineer is the "Security" tube for protecting and storing blue print



Tube for Storing Blue Print and Drawing Paper—
Fig. 7—View of the Tube

paper, tracing cloth and drawing paper, which has just been placed on the market by Kolesch & Co., 138 Fulton Street, New York City. The tube, a general view of which is shown in Fig. 1, is made of heavy tin japanned black and is supplied in three lengths—30 in., 36 in. and 42 in. The tube is provided with brackets so that it can be fastened to the drafting table or to the wall according to preference. The paper is easily loaded into the tube simply by pushing back the slide cover and closing it, the paper remaining thoroughly protected without again opening until the entire roll has been

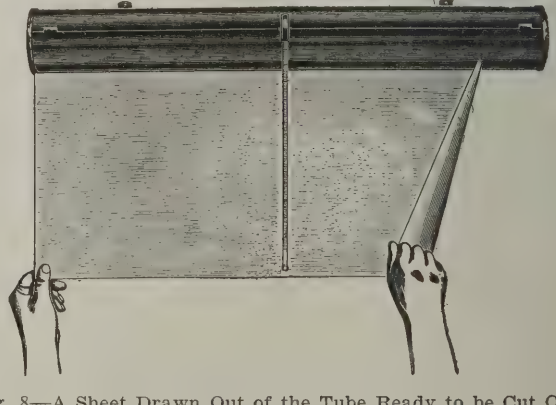


Fig. 8—A Sheet Drawn Out of the Tube Ready to be Cut Off

used. When a sheet of specified length is desired the attached spring measuring-tape is drawn to the required length, the paper or cloth drawn out accordingly and is easily cut by means of a straight cutting edge provided for the purpose. An idea of the operation may be gained from an inspection of Fig. 2. The claim is made that the Security tube affords every convenience to the user

(*Continued on page* 90)



Dead Weight and Live Weight

"Did ye ever stop to figger out why it is that a 150 pound **dead** man is twicet as heavy to lift as a 150 pound live man?

"Or why yer kid weighs twicet as much when he goes asleep in yer arms as he did when he was laffin' and kickin' and huggin' ye round the neck?

"I'll tell ye the reason—it's because the dead man or the sleepin' kid **don't respond** to yer lift—they jest sag back; all dead weight.

"It's exactly the same with wheelbarrows. Some are so loose in the joints that they sag back and sway sideways kind-o squeechy-like—resistin' your pull instid of respondin' to it.

"Gosh! but that makes heavy work fer the poor devil between the handles!

"***Sterlings*** are different—they **respond**—come right up smilin'; kind of joshin' you fer not givin' them a real 'man-size' load to carry when they're already carrying, say, 1,000 lbs.

"I'm kinder puzzled to know the why of it and hope some scientific feller will come along some day and explain."

TIM TRUNDLE

When you meet "Tim" tell him the easy lifting of **Sterling** Wheelbarrows comes chiefly from two things; one is the correct balance of its load, and the other is that handles, legs and wheel mountings are so joined and braced that they're as staunch as if they were **one piece of spring steel** full of life and rebound.

Sterling Wheelbarrow Co.

6201 Shenners Ave., West Allis, Wis.

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

ALPHA-

More than Four and a Half Million Bags of it

used in the New York Aqueduct, the greatest water tube of the world. It is 111 miles long, has a diameter up to 17 feet and at points runs 500 to 1100 feet below the surface. Will deliver 500,000,000 gallons of water daily and is expected to meet the needs of the metropolis for several generations.

Such undertakings call for the highest type of engineering skill and the most dependable materials.

ALPHA, the hourly tested and guaranteed Portland Cement, as usual, made an enviable record for itself.

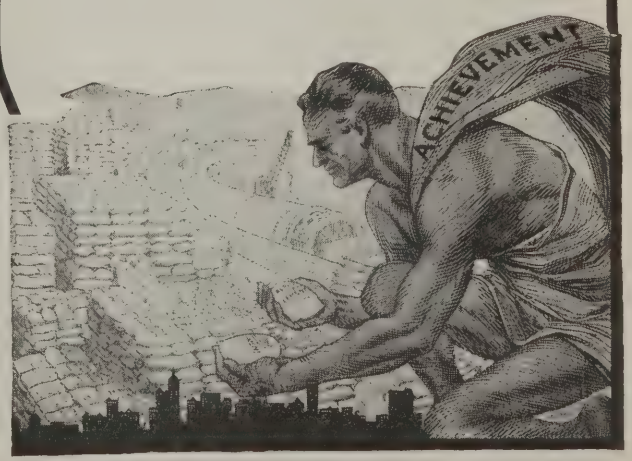
Art Envelope No. 17, containing views of Aqueduct work, Galveston Sea Wall and other famous undertakings, sent free on request.

Alpha Portland Cement Company

General Offices: Easton, Pa.

SALES OFFICES:

Boston, New York, Philadelphia, Pittsburgh, Baltimore, Savannah





POSSIBLY you have not given the matter of Garage Hardware very much thought. It will be of interest to you to know that

Stanley Garage Hardware

manufactured by the largest and oldest makers of Wrought Steel Hardware in the world is especially designed for modern garages: concrete, stone, brick or wood.

Stanley Garage Door Holder No. 1774

This is strong and simple in construction. It holds the door open, prevents it from banging shut and damaging the car. A pull at the chain and the door is free to swing shut.

Here is a necessity for every garage, and owing to the great number of automobiles being purchased and the large number of garages being built it is particularly worthy of note, *now*.

Write for the Garage Hardware catalog illustrated above. It is really interesting. Stanley Garage Hardware may be had at most hardware dealers.

STANLEY S.W. WORKS
NEW BRITAIN CONN., U.S.A.

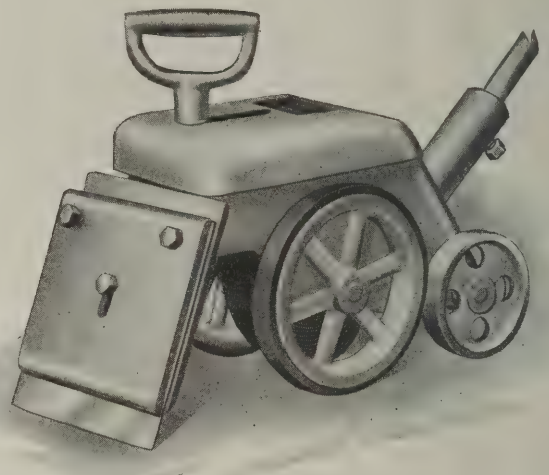
New York
100 Lafayette St.

Chicago
73 East Lake St.

and positively eliminates all waste, loss of time and the inconvenience of opening and closing a tube every time paper or cloth is required.

New Models of Triple "A" Floor Smoothers

With a view to meeting the increasing requirements of the trade the Triple "A" Machine Company, 4101-4105 Ravenswood Avenue, Chicago, Ill., has just added to its assortment two new models of Triple "A" spring-



New Models of Triple "A" Floor-Smoother—Fig. 9—View of Model "F"

driven floor smoothers, illustrations of which are presented herewith. Fig. 1 shows a general view of what is known as model "F," which, although somewhat simplified in construction, embodies the essential Triple "A" features that have made the old standard floor smoother so well known to the trade. In Fig. 2 is shown a general view of model "G." The machines are spring-driven and herein, the company points out, lies the secret of the great success of the Triple "A" floor smoother, as its powerful automatic motor spring pulls about two-thirds the load on the cutting stroke, and this aids the opertaor in a simple and most effective manner. In operating the machine it is only necessary to push it forward. The spring automatically stops the machine and starts it back on the cutting stroke, thus relieving the operator of fully two-thirds of the effort. The claim is made that the machine has the necessary amount of weight to make a scraper of any size cut full depth the entire length of the stroke, thus avoiding the grit and making a smooth cut. Attention is called to the fact that the machine

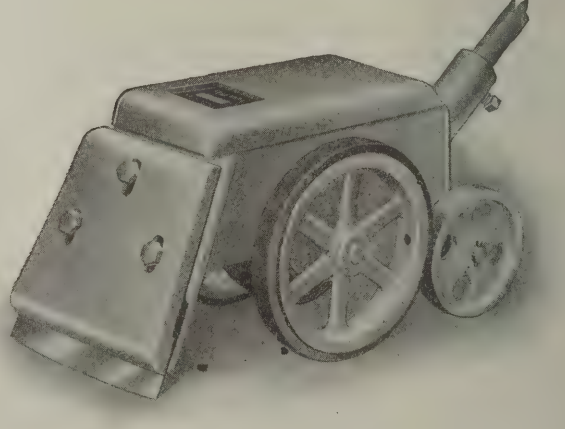
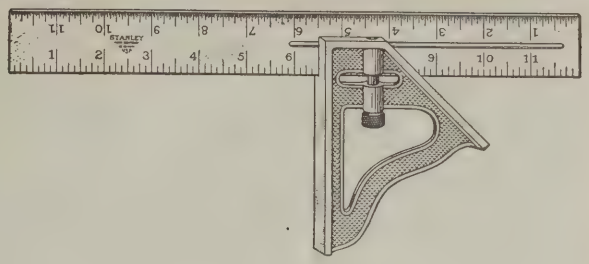


Fig. 10—General View of Model "G"

has opened a new field of floor scraper, as with the spring-driven floor smoother it is as simple a matter to scrape a varnished floor as any other kind, thus making the machine of special interest to carpenters, painters and others having old or varnished floors to refinish. Floor scraping as a "specialty" has been found by a great many carpenters to be a good paying

(*Continued on page 92*)

Stanley Tools



Stanley Adjustable Try and Mitre Square No. 21

One of the handiest tools in a Carpenter's Kit. Especially useful for doing short work about windows, doors, etc., or in putting on butts or locks.

The Blade is adjustable, and as it can be reversed, provides any size of try or mitre square within the capacity of the tool. In reversing, it is not necessary to remove the blade from the handle, consequently the tool is always assembled and ready for use.

The locking device is such as to insure the blade being firmly and accurately secured at any point desired. The edges of the Blade are machined, graduated in 8ths, 16ths and 32nds of inches, and the tool is square inside and out.

It is also an excellent depth and marking gauge.

Both Handle and Blade are nickel plated. Made in three sizes.

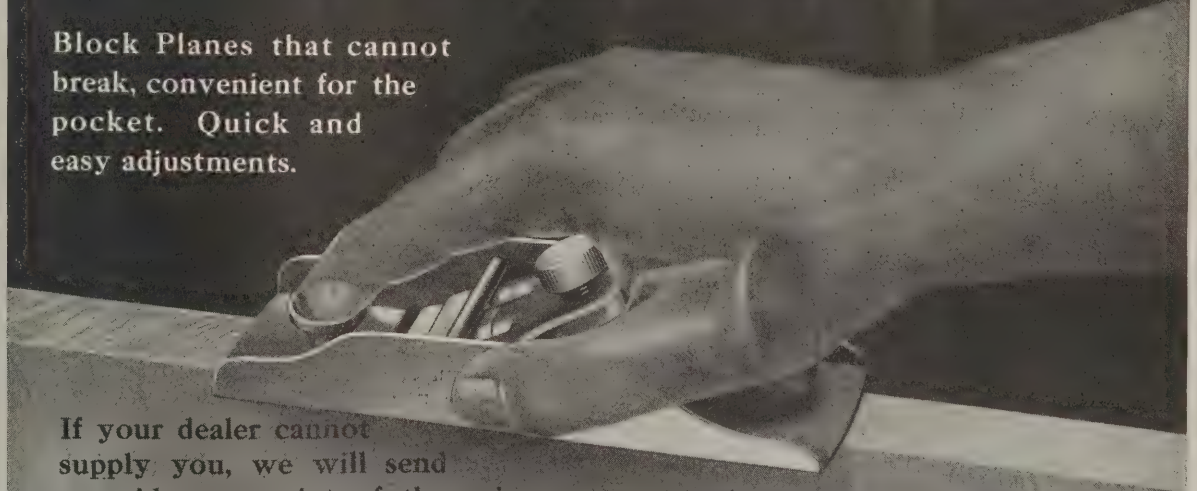
6 in. Blade, each, 55 cents; 9 in. Blade, each, 65 cents; 12 in. Blade, each, 75 cents.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

SARGENT
REG. U. S. PAT. OFF.

WROUGHT STEEL BLOCK PLANES

Block Planes that cannot break, convenient for the pocket. Quick and easy adjustments.



If your dealer cannot supply you, we will send prepaid, on receipt of the price,

No. 5206—6-inch Nickel Plated Plane, $1.00
No. 4206—6-inch Polished Plane, - 90 cents

For full description of Sargent Warranted Planes, send for the Sargent Plane Booklet.

SARGENT & COMPANY, Makers of Planes squares and Mechanics' Tools
53 Water Street, New Haven, Conn.

TRADE MARK NICE REG. U.S.A.

Liquid Wood Fillers

were the first on the market. By reason of the steady maintenance of superiority they are recognized as first in quality today. This recognition comes from the journeymen on the job, who stand by the material that enables them to do the most work **right** in the least time. It comes from the contractor or painter who stakes his future on satisfied customers and satisfactory profit. It comes from the live dealer who knows the value of goods that keep drawing his customers back for more. It comes from architects and property owners who judge by results in service. **You** can depend on "Nice" wood fillers and varnishes—to assist materially in boosting your business.

Write today for price list and other literature.

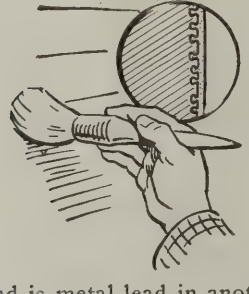
Eugene E. Nice

Manufacturer of

Varnishes, Fillers, Paints, Stains, Enamels, Colors.

Philadelphia, Penna., *and* Camden, N.J.

LEAD PAINT
Dovetailed On



PURE white lead is metal lead in another form. Under a blow-pipe flame, it returns to the metallic state. A building painted with strictly pure white lead and pure linseed oil, like

Dutch Boy White Lead

and Dutch Boy linseed oil, is sheathed in a solid coating which, while not lead, is derived from this durable metal and has many of its characteristics.

This lead-like sheet, instead of being nailed on, might be said to be dovetailed fast, for it is held by thousands of tiny tentacles of the coating material itself. It is only as thin as paper but plenty thick to withstand the extreme changes of wet and dry weather and of burning heat and biting cold.

Folders "C" FREE Our handy, general painting specifications and useful chart of color combinations should be in your catalogue file. Write nearest branch for Folders "C."

NATIONAL LEAD COMPANY

New York Boston Cleveland Chicago
Cincinnati Buffalo St. Louis San Francisco
(John T. Lewis & Bros. Co., Phila.)
(National Lead & Oil Co., Pitts.)



business. It takes very little effort to find any number of floors which need re-surfacing and most of the owners are willing to pay a fair price for having the work done. The trouble heretofore has been that it was too hard work to scrape a varnished floor by hand, and many were therefore loath to take the job except at what might be regarded as an exorbitant price. With the equipment here described, however, this class of work may be made a most profitable enterprise on the part of the carpenter-contractor. The company has just issued a new catalog describing in detail the new models and we understand a copy will be sent free to any address upon application.

Catalog of Builders' Hardware

Architects, builders, carpenters, contractors and house owners generally are likely to be interested in the very attractive 96-page catalog of builders' hardware which has recently been issued from the press by the National Mfg. Co., Sterling, Ill. The printing is upon a fine quality of surfaced paper and the numerous illustrations are brought out with a clearness which renders the catalog a pleasure to examine. The leading lines of specialties are presented in attractive style and accompanying each is brief descriptive data covering features concerning which the architect and the builder are interested. Attention is called to the fact that instead of the electro-galvanizing process which the company has always used in the past it has now adopted the process of rust-proofing metal called Sherardizing. In this treatment the parts, after being thoroughly cleansed, are put into a large steel drum with zinc dust. The drum is then securely closed, placed in an oven and heated to about 700 deg. By this means the molecules of the steel become active and the zinc dust penetrates into the skin of the steel and forms a zinc-alloy, or in other words becomes part of it. It is said that Sherardizing cannot peel off or crack and will last for years.

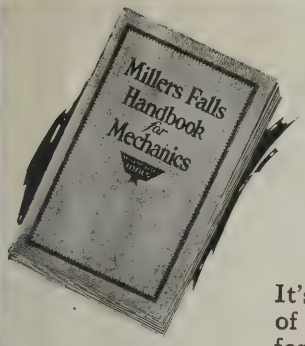
New Style of House Construction

The attention of builders is being directed to a new style of house construction which has been invented by E. P. Caldwell, 15024 Marshfield Avenue, Harvey, Ill. Each side wall, ceiling, etc., is formed of a single huge block covered with gypsum stucco. These blocks are joined together, making a house which is practically one solid piece. The walls go down to the bottom of the foundation, and above ground they have a 4-in. dead air space, tending to keep the house cool in summer and warm in winter. Pictures of the building of a house in various stages of construction, together with full description, are contained in a folder which he issues. Mr. Caldwell claims that a house can be put up much quicker and at much less cost than usual. It is said to be fireproof, cyclone proof, moisture proof, durable and at the same time sanitary and scientific in its construction.

The Concrete Dope Book

We have just received from the Cement Tile Machinery Company, 124 Rath Street, Waterloo, Iowa, a copy of the little work which has been so extensively advertised in various publications during the past few months. The company makes announcement that the book is now ready for the contractors of the land who have so numerously requested that a copy of it be sent them. We understand it is the intention of the company at this time to make it an annual proposition. Deviating from the usual routine of issuing a catalog, the company has taken the problems of the concrete man into consideration and combined a few pages illustrating and describing Winner mixers with a few pages of concise information that will be found of value to the building-contractor in his every-day work. Great pains have been taken in the selection of the tables, figures and data presented in the book although the company does not guarantee that they are absolutely correct in every instance, but they are submitted as a basis for forming and checking builders' own calculation. Among the more interesting tables are those showing the cost of solid concrete foundations, the materials

(*Continued on page* 94)



Send for This Handbook

It's *Free.* 60 pages of mechanical information that has never been compiled before. A mine of the most valuable kind of facts, formulas and helpful hints.

MILLERS FALLS MECHANICS' HANDBOOK

Here are a few subjects:
Weight per foot of wood.
Wood staining recipes.
Putty, cements and glues for wood.
Number of nails to pound.
How to figure board measure, shingles, paint, brickwork and stonework.
And 50 other subjects.

Send for Book No. 4

MILLERS FALLS CO.
104 River St., Millers Falls, Mass.

The Answer to the Outside Painting Problem
ZINOLIN

NAME the most difficult-to-meet requirements you ever made of any paint before using it or specifying it. Then, from the below list, see if Zinolin, the "Arnold-ized" Zinc, has not only met but exceeded any expectation you ever dared hold concerning a paint.

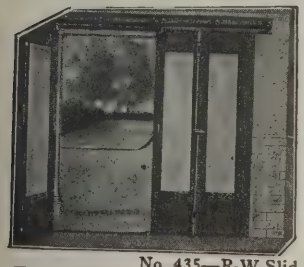
This Revolutionary Paint—

1—Permanently holds its luster.
2—Gives a whiter white than ever before known for outside.
3—Holds its colors absolutely fast.
4—Covers 30% more surface per gallon than white lead.
5—Does one coat work which quite often equals two.
6—Hides jet black with two coats of pure white.
7—Gives a tougher, more durable coat.
8—Does not crack, chalk, blister or peel.
9—Is easier and quicker to apply.
10—Breaks up easier than white lead, saving the painter's time.

The full facts are given in our LEAFLET and you ought to have this LEAFLET at once. Send for it now.

Keystone Varnish Co., 2012 Keystona Building BROOKLYN, N. Y.

Makers of justly famous Keystona, the original washable wall paint.



No. 435—R-W Sliding-Folding Door.

When Garage Door Equipment is needed

When the garage is decided on, its size and construction, the next question is, how to hang the doors.

Here are illustrated two popular sliding door arrangements in the line of

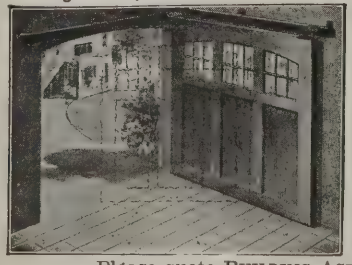
R-W Garage Door Outfits

No. 435 R-W Sliding-Folding Door Hangers can be used on the small private garage as well as the large public garage. For the public garage the doors can be arranged so as to be operated by electric motor.

No. 235 R-W Right Angle Door Hangers give an ideal arrangement and are very generally used.

Ask for special Garage Door Equipment catalog or Locking Garage Door booklet.

No. 235—R-W Right Angle Door.



Richards-Wilcox Manufacturing Co.
Aurora, Ill.

G. W. Oliver Residence Rochester

Architect, W. J. Brocket Rochester



Herringbone
for Succcessful Homes

Lasting beauty and satisfaction with stucco and plaster depend a good deal on the lath you use.

Herringbone Rigid Metal Lath has lengthwise ribs which make it extra stiff, and flattened strands which clinch the plaster so that neither fire nor age will cause it to crack or fall.

Easy to erect—economically plastered. Send for the Herringbone Catalog.

GF YOUNGSTOWN, OHIO. Trade Mark

Fireproof Building Materials and Waterproofings for Every Building Need

GF YOUNGSTOWN, OHIO. Trade Mark

The General Fireproofing Co.
305 Logan Avenue Youngstown, Ohio

An Improved Convertible Level



for
Architects
Builders
Contractors

For use as a level or for taking vertical sights.
Why pay for a surveyor's or engineer's transit when this instrument will take your angles?
The price is low.
Our exclusive feature: Patented one piece phosphor bronze axis, by means of which level is converted into a transit in a few seconds without screws needing adjusting.
Write for catalog of Convertible Level and our full line of drawing materials, etc.

New York Blue Print Paper Co.
58-60 Reade St., New York



Patented Axis

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

required for 100 sq. ft. of concrete floor, also for 100 sq. ft. of concrete sidewalk with figures of actual cost of 100 lineal ft. of sidewalk and of 1000 sq. ft. of sidewalk. There are also given the quantities of materials required for plaster work of various kinds; the materials required for 1 cu. yd. of concrete; the proper thickness of walls and quantities of materials for different heights of basements; the cost of various classes of concrete construction; the thickness of foundation walls for buildings of various heights; cost of concrete blocks of various mixtures; the number of common brick required for different walls; estimate of quantities for plaster and mortar; cost of exterior plastering and material required, together with much other helpful information.

Two Mammoth Concrete Mixers

There has just been completed by the T. L. Smith Company, 3120-F Hadley Street, Milwaukee, Wis., two concrete mixers which are probably the largest ever turned out in this country. Each one of these two Smith tilting mixers has a capacity of 108 cu. ft. of mixed concrete per batch, or between 150 cu. ft. and 160 cu. ft. loose unmixed material. They are in fact two 4-yd. concrete mixers. The circumstances attending their manufacture are in effect as follows: The Hardaway Contracting Company of Washington, D. C., recently secured the contract for an immense concrete dam to be built at Salisbury, N. C., the contract requiring them to pour 60,000 cu. yds. a month until the job is finished,

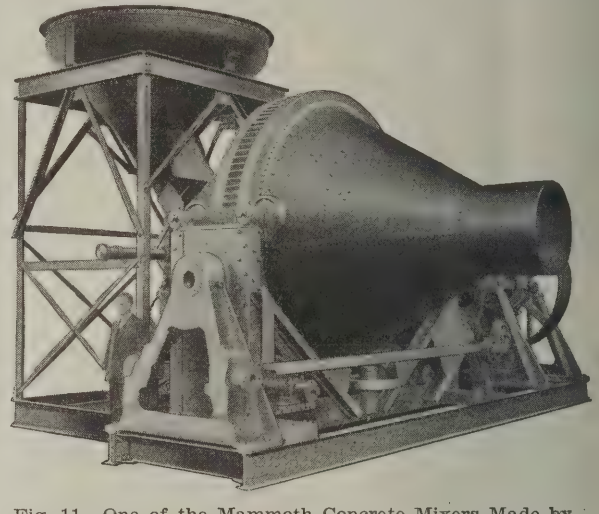


Fig. 11—One of the Mammoth Concrete Mixers Made by the T. L. Smith Co.

or a total of about 1,000,000 cu. yds. The company found that four 2-yd. mixers would occupy too much lateral space and it therefore became absolutely necessary to use two 4-yd. mixers. The Hardaway Contracting Company had been using a titling type of mixer but not a Smith. They therefore went to the manufacturers of the machines they had been using and showed them the specifications, but that concern was not in a position to build them, so the Hardaway Company called upon the T. L. Smith Company, who made up specifications and stated that it was in a position to erect mixers that could do the job and at the same time would take care of the capacity desired. The result was an order for the two machines. From an inspection of Fig. 11 it will be seen that the machine is mounted on steel skids with an enormous batch hopper supported by a steel frame. The mixer itself is equipped with power tilt and also with Allis-Chalmers clutch pulley. The mixer drum is made of ⅜-in. steel and the inside diameter of the drum ring is 9 ft. 5 in. The height of the machine as compared with an ordinary size man may be gathered from an inspection of the picture. The weight of each machine is 46,000 lb.

New "Classik" Ceiling Catalog

Some new effects in stucco and Colonial designs are presented in "Classik" Catalog No. 21 which has just been issued from the press by the Berger Mfg. Co.,

(*Continued on page 96*)



Two Legs Better than One

That is reasonable whether you are talking about Building Brackets or men. There is just as much difference in the stability of the "Trouble-Saver" Building Bracket with two legs and the ordinary bracket with one leg as there is in the stability of a man with two legs and another man with one. The

"Trouble-Saver" Building Bracket

is absolutely solid—no wabble at all. The legs brace against each other. Each unit is capable of sustaining one ton.

You can erect as many "Trouble-Saver" Building Brackets in 5 minutes as you can wooden brackets in 5 hours.

Use "Trouble Savers" and save time and material.

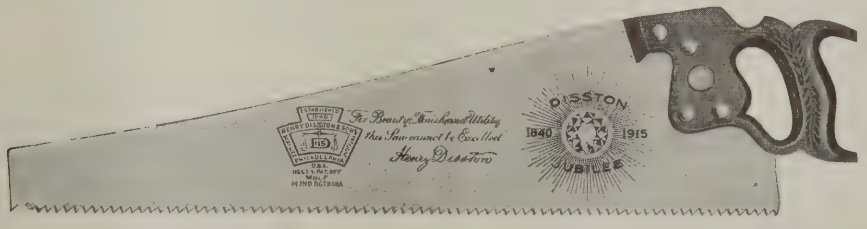
Write for particulars.

The Steel Scaffolding Co.

EVANSVILLE, INDIANA

A Good Mechanic Can Do a Job With Any Tool, But—

—not so well—not so quickly—not so easily as he can with a good tool



DISSTON SAWS

are the saws for the good mechanic because a skilled mechanic takes a pride in his work and in his tools. It's a satisfaction to own and work with a Disston Saw.

Booklet of Sharpening Instructions, Free

HENRY DISSTON & SONS, Inc., Philadelphia, U.S.A.



Sturdily Built

A glance at the cut shows how **substantially** the

Dietzgen No. 6013 Convertible Architect's Level

is made. It can be quickly changed into a plumbing transit—will hold adjustment—is easy to operate—will stand hard service.

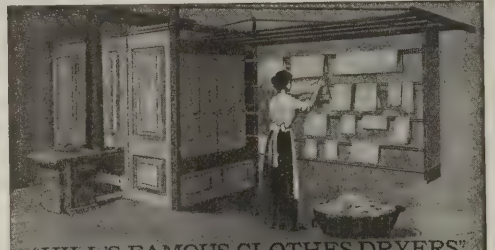
Write for Detailed Description

EUGENE DIETZGEN CO.

Manufacturers

Surveying Instruments Measuring Tapes Drawing Materials

Chicago New York San Francisco New Orleans Toronto Pittsburg Philadelphia



"HILL'S FAMOUS CLOTHES DRYERS"

The HILL-CANTON CABINET CLOTHES DRYER

Quick Drying

For Residences, Apartment Buildings and Institutions



HILL'S CLOTHES DRYER

FOR THE LAWN also BALCONY and ROOF DRYERS

The "Hustler" Ash Sifter

Saves Coal Prevents Dust



HILL DRYER CO.

WORCESTER, MASSACHUSETTS

Send for Catalog to 318 Park Avenue

Canton, Ohio. It is artistically printed on heavy coated white enamel stock, bound inside an attractively embossed cover. Aside from the many beautiful illustrations of unique "Classik" patterns, additional interest is provided by picturing the interiors of theaters, churches, stores, lodges, etc., in which these ceilings have been installed. The catalog gives much valuable information of a general character relative to the use and application of steel ceilings, as well as pointing out the many special features that characterize the "Classik" line. A copy of the catalog will be sent to any architect, builder or contractor of standing upon application to the address above given.

Rex Roofing and Shingles

One of the most attractive examples of trade literature which it has been our recent privilege to examine is the 112 page catalog relating to Rex Products which has just been issued from the press by the Flintkote Mfg. Co., 98 Pearl Street, Boston, Mass. Among the early pages are some interesting comments stating the



Rex Roofings and Shingles—Fig. 12—Laying Rex Strip Shingles

best way to purchase Rex Products, also information for use in ordering goods to be shipped direct by the company and a few words which are addressed to those who have not used the goods in question. The illustrations for the most part are halftone engravings, many of which represent buildings in connection with which the company's product has been used. Considerable attention is given to the exposition of the merits of Rex shingles which are described as "a standard roofing material for residences, bungalows, churches, schools and for all sloping roofs where an attractive, durable and fire-resisting roof at a moderate price is wanted." Rex Cut Corner Shingles are made by cutting off two of the corners of Rex shingles, these being offered in two colors—dark red and grayish green. In quality and durability the two are the same and both are guaranteed for ten years without painting or renewal. Rex Strip Shingles are also made in two colors and consist of strips of heavy roofing each 10 in. wide by 32½ in. long, so cut that when laid on the roof each strip looks exactly like four separate shingles. Only five nails are said to be required for each strip of four Rex shingles, thus effecting a great saving both

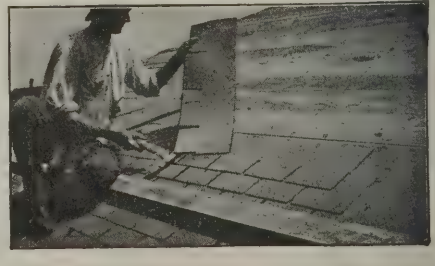


Fig. 13—Another View of the Laying of Rex Strip Shingles

as to nails and the labor of nailing. Only 111 strips of four shingles each are required to cover a square of surface, the strips being land 4 in. to the weather. In Figs. 12 and 13 we show the manner of laying Rex Strip Shingles, the statement being made that two men in Milwaukee laid 14 squares of "strips" on a straight roof in 8 hr. These shingles are made of heavy-weight felt thoroughly saturated with high-grade asphalt. An extra heavy asphalt coating is then applied to the upper side of the felt and while this coating is hot there is

(*Continued on page* 98)

Move Your Jobs FREE for 30 Days

Use our complete house-moving outfit **Free.** Prove to yourself that you can make double the money you are now making.

ALL STEEL GIANT TRUCKS

with our complete equipment, are used by almost every practical house-mover in the country. The house-moving contracting business is increasing every day. The man with the right equipment gets the work. Start now and get the cream. Experience not necessary. We help you start. Write now for complete facts and Free Trial offer—ask for catalog "E." Address



La Plant-Choate Mfg. Co.
625 Eastlock Ct., Cedar Rapids, Ia.
Members of the Iowa House Movers' Association





YOU—

can save the cost of this "Builders'" Tilting LEVEL on a single job by avoiding mistakes that are expensive.

It is a "KOLESCH"

and its use assures error-proof work

Designed with special reference to the needs of Architects and Builders in leveling walls, laying out angles, grading streets, sewers, drains, sidewalks, etc.

Send for full description and 300-page catalog of Surveying Instruments and Drawing Materials.

KOLESCH & CO., 138 Fulton St., N. Y.

Springtime Is Building Time

Soon there will be a demand in all localities for men to build new barns.

This call is welcomed by the contractor who uses *PORTER SERVICE,* since he knows he can build the new barn in double-quick time and guarantee a thoroughly modern and workmanlike job.

Consider what it means to receive authentic and practical data covering the construction, arrangement, ventilation, etc., of each *individual* barn. That's what *PORTER SERVICE* renders—and it's *FREE.*

SERVICE
that which identifies
PORTER BARN EQUIPMENT

The name *PORTER* is identified with that practical and durable kind of *BARN EQUIPMENT.*

J. E. PORTER CO.
638 Fremont Street, OTTAWA, ILL.

In every summer cottage you build



—you can install, *at a profit,* a

Ro-San Indoor Closet

Every building—home, cottage, store or office—that has no sewer connection needs this modern sanitary indoor closet. Absolutely odorless. Act as our agent—this fixture sells easily to your customers—good profit. Hundreds of carpenters represent us. We also distribute through builders the

Ro-San Washstand

Provides Running Water, Hot or Cold, Without Plumbing. Every housewife wants one. Convenient, sanitary. Sells readily with little effort. Carry this work along with your regular business. Ask for terms to agents.

Absolutely Odorless Sold on a Real Guarantee

ROWE SANITARY MFG. CO., 485 Rowe Bldg. Detroit, Mich.

Get H-L-F LUMBER Price

Make $50 to $500 MORE per job

Send bills of materials quick

for H-L-F bid. Our prices still low in face of fast advancing market.

You can get H-L-F prices *quick* without bill of materials. Ask how. New Material Catalog free. Plan Book 10c. Barn Builder's Guide 4c.

Capital $1,000,000 Not in any trust or combine

Hewitt-Lea-Funck Co. 659 Funck St. Sumner, Wash.

GOODELL PRATT 1500 GOOD TOOLS

GOODELL PRATT 1500 GOOD TOOLS

The Story of the Stratton Level



This booklet tells how two carpenters built levels, fifty years ago. It tells of the loving care, the old fashioned honesty and the Yankee ingenuity that have made Stratton Levels the best for nearly fifty years.

Sent Free to You

Goodell-Pratt Company

Greenfield *Toolsmiths* Mass., U. S. A.

HESS MEDICINE SANITARY CABINET LOCKER



The Only Modern, Sanitary STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



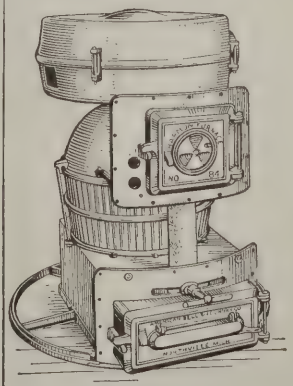
The Recessed Steel Medicine Cabinet

Send for Illustrated Circular

The Outside Steel Cabinet

HESS, 1201-L Tacoma Building, CHICAGO
Makers of Steel Furnaces. Free Booklet

Hold on a Minute!



There's no need of figuring any further until you know whether your prospect wants his heating system piped or pipeless.

We can satisfy him either way. Illustration shows our Harmon Piped Furnace—all cast iron as you see it, without the casing.

May we help with your specifications?

American Bell & Foundry Co.

Northville Mich.

LOUDEN



GARAGE DOOR-HANGER

Low enough in cost for the cheapest garage—Classy enough in appearance for the most particular buyer.

Swinging doors for a garage are clumsy and inconvenient. A sliding door track that extends to a post in the yard takes up valuable room and does not present a neat appearance.

The Louden Special Garage Door overcomes these faults, and is far superior to any other type. Being hinged in three parts it follows a very short curve in the track and creates no waste space, either inside or outside the building.

The track is supported every 12½ inches by a strong malleable bracket; cannot sag or get out of shape. The door always hangs true. The swiveled trolleys are roller bearing. They cannot bind or jump the track. One section of the Louden Garage Door swings like an ordinary hinged door.

Prices per set, including all hardware for door, range from $3.70 *to* $4.15. *Write for booklet No. 9.*

THE LOUDEN MACHINERY CO.
5402 Court Street, Fairfield, Iowa

Here's a New Vise

"YANKEE" No. 1993

With Swivel Base. DETACHABLE



Quickly detached from swivel base by the turn of a set screw; and being accurately machined all over can be used in any position as a jig for special work on drill press, shaper, etc.

Holds work rigid at any angle with use of the special grooved block.

The swivel base is easily and firmly locked and released in any position by a short movement of lever at the side. Jaws 2¾ in. wide, 1⅞ in. deep, opening 3⅛ in., base 7½ in.

Ask your dealer to show you.

Let us send you the "YANKEE" Book. A postal brings it.

Tells you all about the "Yankee" line

NORTH BROS. MFG. CO.

Lehigh Ave., PHILADELPHIA, PA.

rolled and compressed into it an even layer of natural chipped red or green slate selected for its rich permanent colors.

Another portion of the catalog under review is devoted to Rex-Tile Shingles, which in their method of laying differs from other shingles. They are nailed at the butt end and no nails are exposed to the weather. The lower end of each Rex-tile shingle is folded back 1½ in. and two nails are driven through this fold and not through the face of the shingle. This folding is done by patented machinery and when sent out the shingles are ready to lay. The value of this simple fold is said to be first in the fact that a Rex-tile roof is absolutely wind-proof, as the shingles can neither blow up nor curl up. Again they can be used on all kinds of covered curved surfaces because they are fastened at the butt and also for this reason they are more satisfactory for siding than would otherwise be the case. These shingles are made in a beautiful soft shade of Indian red which harmonizes with the color scheme of stucco and concrete houses, and bluish black which is said to be suitable for use wherever the color of slate would be in good taste.

Other portions of the catalog are given up to Rex Canvas Roofing, which is especially adapted for covering sleeping-porch floors, verandas, balconies, piazza roofs and decks of all kinds; Rex Flintkote Roofing, which is intended to be used on any roof having a slope of ½ in. or more per lineal foot; Rex Slate-surfaced Roofing furnished in reels 32 in. wide and 46 in. long; Rex Valley and Ridge Strip; Zarex Roofing; Mikado Roofing; Rex Roof Paints, Waterproof Paper, Adamant Flooring, etc., etc. A number of pages are devoted to an interesting description of roofings of other types, including wood shingles, slate, asbestos shingles, terra cotta tile, tin and corrugated steel, the object being to place trustworthy information before those who have had but little roofing experience, so that they may be able to choose wisely. Directions are given for measuring roofs, also for laying Rex Products, the instructions being illustrated by means of sketches so as to render every point readily understood. A comprehensive index completes the catalog.

Improved Architects' Wye Level

A level which embodies a number of interesting and valuable features and which is being brought to the attention of architects throughout the country is that illustrated by the engraving Fig. 14. It is a high-

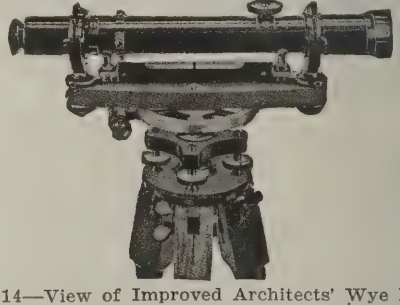


Fig. 14—View of Improved Architects' Wye Level

grade improved wye level and is offered by the New York Blue Print Paper Co., 58-60 Reade Street, New York City. The complete instrument weighs only 5 lb. and the tripod 6 lb. The wyes are provided with a locking arrangement which securely fastens the clips. The level is provided with improved clamp and tangent screws with counter spring. The horizontal circle of 3 in. diameter is graduated to degrees and the vernier reads to five minutes. The 12-in. telescope with which the level is provided is achromatic and has a magnifying power of nineteen diameters. The object glass is 1 3/16 in. in diameter and has rack and pinion focusing with adequate protection to the glass. The 5-in. spirit level is ground to a sensitiveness of sixty seconds and is graduated on glass. The level is ribbed, thus reducing the weight while maintaining its strength.

Special File Offer for Carpenters

In our last issue we made brief reference to the hand-saw files of the Delta File Works, Philadelphia,

(*Continued on page* 100)



WEATHER VANES

ALL SIZES AND DESIGNS

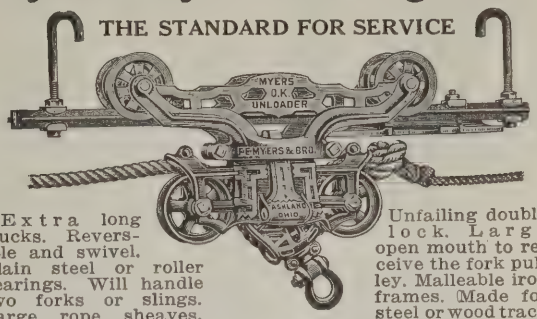
SEND FOR CATALOGUE

E. G. Washburne & Co.

208 Fulton Street New York

Myers Hay Unloading Tools

THE STANDARD FOR SERVICE



Extra long trucks. Reversible and swivel. Plain steel or roller bearings. Will handle two forks or slings. Large rope sheaves.

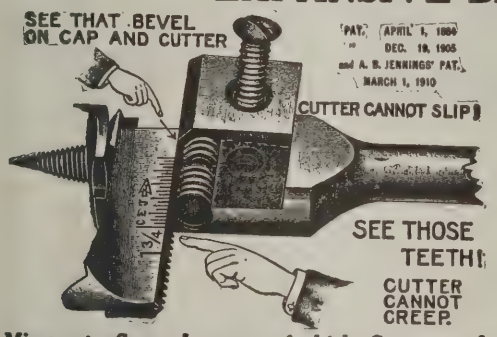
Unfailing double lock. Large open mouth to receive the fork pulley. Malleable iron frames. Made for steel or wood track

Write for Hay Tool Booklet.

F. E. MYERS & BRO., Ashland, Ohio

ASHLAND PUMP AND HAY TOOL WORKS

C. E. JENNINGS STEERS PATENT EXPANSIVE BIT



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. Sole Mfrs. 71-73 Murray St., N. Y.

FINISH THE JOB RIGHT

Use The "Ideal Gutter"

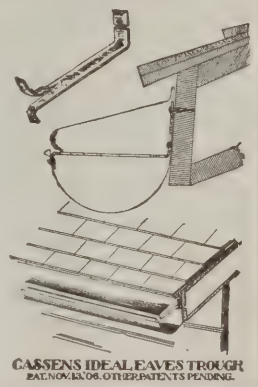
Cassen's Ideal Eaves Trough overcomes the disadvantages of the old-style open gutter. It insures clean, healthful cistern water. It is never clogged.

Have you seen it? If not we want you to try it. If "The Trough with the Lid" doesn't beat anything you have ever seen in the gutter line, tell us and you get your money back.

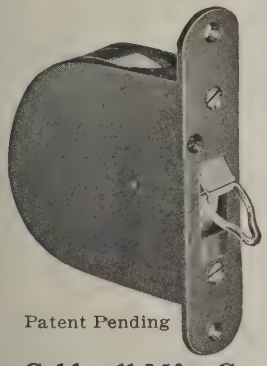
Write us for full particulars.

CASSENS MFG. CO.

Edwardsville, Ill.



CALDWELL SASH BALANCES UNIFORM MORTISES



For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Patent Pending

Write for circular

Caldwell Mfg. Co., 5 Jones St., Rochester, N. Y.

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB



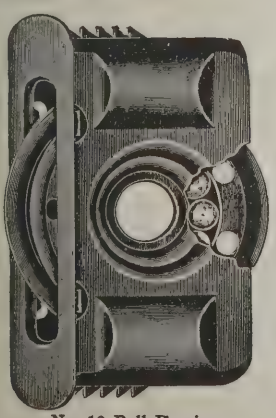
Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 3d galvanized No. 13 gauge 1¼ inch wire nails.

List price $7.00 (but an order from this ad will bring you either size by prepaid parcel post for only Five Dollars).

Pearson Mfg. Co.

Robbinsdale, Minnesota

Makers of Hand Nailing and Tacking Tools



"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

No. 10 Ball Bearing.

Grand Rapids Hardware Co., 160 Eleventh Street Grand Rapids, Mich.

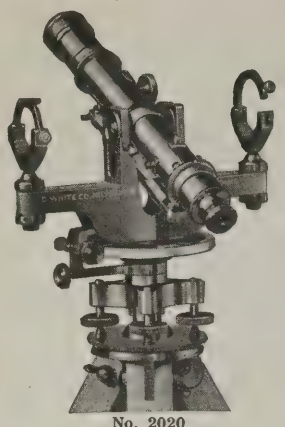
MACK & CO.



YOU will always feel secure when you use Barton Planes and Edge Tools. The making of keen edged tools that hold their sharpness is our hobby. If your dealer won't supply you we will.

There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

Brown's Race & Platt St., Rochester N.Y.



No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

A Free Book

—on Concrete Machinery

Porches
Vases
Chimneys
Flower Boxes
Building Blocks
Fence Posts
Drain Tile
Sewer Pipe
and Others

Not exactly a catalog because it gives the cost of making many concrete products — Blocks, Bricks, Porches, Chimneys, etc. Also tells about the profits in making Drain Tile for farmers; describes the advantages of farm drainage, etc.

GET this book if you are interested in concrete. Contains a lot of valuable information and interesting reading. Sent free upon receipt of a postal card.



W. E. Dunn Mfg. Co.

416 24th Street, Holland, Mich.



Pa., calling attention to the three "specials" which were being offered and known respectively as the "Carpenter's Special," "Mechanic's Favorite" and "Expert's Choice." Each represents a special length, is made of crucible steel with a deep tooth and the correct angle that will assure the greatest efficiency. Special notice is directed to the announcement of the manufacturers that a complete sample set will be sent prepaid to any building mechanic on receipt of a special price if not sold in his own town.

Frank H. Moss Makes New Business Connections

Announcement is made of the fact that Frank H. Moss, after seven years' service, has severed his connection with the Mahin Advertising Company, and has joined the forces of the Macavoy Advertising Company, Chicago, Ill., assuming the office of vice-president. He is well known in the business world for his merchandising work and sales plans, and in his new connection will have direct charge of merchandising investigations and sales campaign development. Many building-contractors and plumbers throughout the country are acquainted with Mr. Moss, as it has benn his practice to consult with them for the purpose of obtaining their viewpoint before undertaking an advertising campaign. Mr. Moss is the author of a *brochure* entitled "Putting it Thru—Not Over," which has attracted a great deal of attention for its presentation of the ethics of modern business.



Berry Rockwell, formerly associated with Mr. Moss while connected with the Mahin Advertising Company and prior to that merchandising expert for the Curtis Publishing Company, has also joined the Macavoy Advertising Company. Another addition is Gridley Adams, who for the past three years has been advertising manager for the Stewart-Warner Corporation. The addition of these three men to the staff of the Macavoy Advertising Company is a part of the plan for a new type of advertising service which combines with the usual principles of service real merchandising work that has proven a great benefit to all using it.

New Location for Triple "A" Machine Company

During the past year or two the demand for Triple "A" floor smoothers has been such as to interfere many times with prompt shipment, and with a view to providing increased facilities, the Triple "A" Machine Company has moved into its new factory and offices at 4101 and 4105 Ravenswood Avenue, Chicago, Ill. It has discontinued its factories at Manistee, Mich., and Harvey, Ill., and will combine its entire output at the new Chicago plant.

Natural Wood Finishing

The proper finishing of exterior and interior woodwork is a question frequently confronting the practical carpenter, builder, painter and finisher, especially in the case of the popular hardwood finish. The materials which must be used in order to secure a uniform finish under all circumstances and which brings out the beauty and natural characteristics of the wood becomes of paramount importance. Interesting information on the proper materials to use is contained in a booklet bearing the title "Natural Wood Finishing," which has been issued by the Eugene E. Nice Co., 201 Spruce Street, Philadelphia, Pa.

Slate and Slate Products

A Digest of Slate and Slateroofers' Supplies has been compiled for the slate trade by J. Bray & Co., East Bangor, Pa., and within the covers of the little work is described the best method of putting on slate. It states that slate should never be laid flat in piles, but always on edge, as near perpendicular as possible, never putting more than three piles on top of each other with lath or board between them. Interesting information

(*Continued on page* 102)

When a Wall Tie is a Wall Tie it is the Whalebone



Made in any length from five inches to fifteen inches. Standard size for Solid or Veneer walls 7 inches by ⅞ inches, weighing 50 pounds to the M. Packed 1000 to the box.

Price on standard size, based on 21 gauge material, $4.00 Pittsburgh per M. Shipments made same day order is received.

Can quote on lighter or heavier material if desired, as we can supply the Standard Whalebone in boxes weighing from 35 pounds to M to 85 pounds to M, according to thickness of material.

Allegheny Steel Band Co.

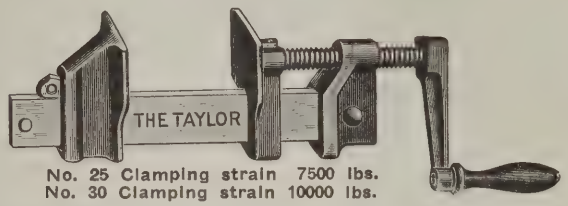
BELL PHONE: 718 Cedar. North Side: PITTSBURGH, PA.

Quick-Adjusting Self-Locking Clamp

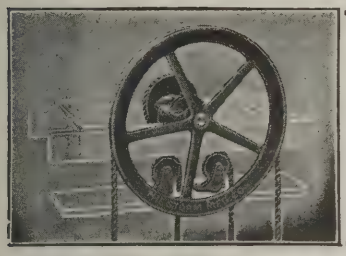
The Taylor Clamp Family is a large one. There is a Taylor Clamp for your needs. Used by many of the large manufacturing companies and by the United States Government. Sliding jaws lock anywhere on the bar with a quick, positive grip, that a jarring strain will not budge. These clamps will pay for themselves in a short time. Let us send you the printed matter. We also make STEEL SCAFFOLD BRACKETS. Booklet on request.

James L. Taylor Manufacturing Co.

Poughkeepsie, N. Y.



No. 25 Clamping strain 7500 lbs.
No. 30 Clamping strain 10000 lbs.



Dumbwaiters and Hand Elevators

Backed by 20 years of successful manufacture. Our catalog will interest you. May we send it?

***The* Storm Mfg. Co.**

52 Vesey St., Newark, N. J.



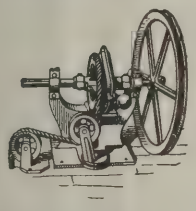
ANY reputable lumber dealer can show you Curtis 1866 Woodwork and Built-in Permanent Furniture in many designs. They will make your work easier and more satisfactory.

The CURTIS COMPANIES, Service Bureau

Clinton, Iowa

1866 CURTIS WOODWORK





Elevators, Dumbwaiters and Sidewalk Lifts

can be operated by Hand, Belt, or Electric power. Any Capacity.

Catalog and prices free on application

J. G. Speidel, Reading, Pa.

WHY not use the particular size, shape and grade of pencil or crayon suited to your work? You will find it among

DIXON'S CARPENTER PENCILS

Send us the name of your dealer from whom you purchase pencils and crayons, together with sixteen cents in stamps and we will send you our liberal sample assortment No. 32-J.

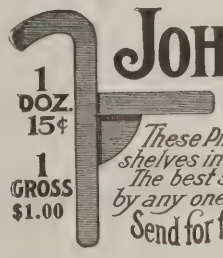
JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.

A B C Dumbwaiter

Called this for its perfection and simplicity. There is none better made. It is built on honor, of the best materials, and is high grade, through and through. A cheap dumbwaiter is dear at any price.

A special feature is our "Safety Check" to hold load at any floor. Let us tell you about it and quote prices.

King Elevator Co., Inc., 397 Bedford Ave., Brooklyn, N.Y.



JOHNSTON'S *Patent* SHELF PIN

1 DOZ. 15¢

1 GROSS $1.00

These Pins are used for supporting movable shelves in Book Cases, Cannot fall out or sag down. The best shelf pin made. Easily put in place by any one.

Send for free sample to **J. D. JOHNSTON, NEWPORT, R.I.**

SEDGWICK

HAND-POWER

DUMBWAITERS and ELEVATORS

Manufactured and Guaranteed by Specialists
Send for Catalog and Information

SEDGWICK MACHINE WORKS

123 Liberty Street NEW YORK

Builders, Contractors and Material Dealers

realize that there is nothing more appreciated than

PERFECT FITTING WINDOW, DOOR and PORCH SCREENS

Our 1916 Catalog contains valuable information and illustrations. A postal card will get you one.

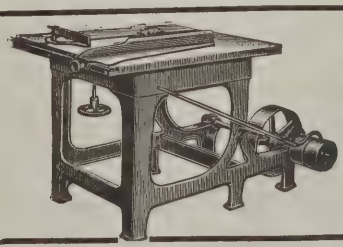
Standard Screen Co., 1848-58 Hastings St., Chicago, Ill.

ELEVATORS

Improved Quick and Easy Rising Steam, Electric and Hand Power Safety

AND DUMB WAITERS
Automatic Hatch Gates
Send for Circular

KIMBALL BROS. CO., Council Bluffs, Ia., 1049 9th St.
Kansas City, Mo., 604 Broadway
Gus Taliaferro, Oklahoma City, Okla.
Western Eng. Specialties Co., Denver, Colo. Wm. Watrous, Salt Lake City, Utah



LOOK!

Only $50.00 for an all Iron SAW BENCH with countershaft complete. It will pay you to investigate. Send for circular giving full particulars.

R. E. KIDDER
22 Hermon Street
WORCESTER, MASS.

1853 BUCK BROS. 1916

BUCK BROS.

Buck Brothers' Tools are LASTING tools—they keep their edge.

We make a full line which includes bevel edged chisels, socket and tang butt chisels, gouges, plane irons, drawing knives, nail sets, screw driver bits, and carving tools. Catalogue explains—get it at once.

BUCK BROS., Millbury, Mass.

NO FALLING WINDOWS
SMASHING GLASS
POCKET FRAMES
SASH WEIGHTS
RATTLING
BINDING
CORDS with
AUTOMATIC
SASH HOLDERS



SPECIFY
USE
DEMAND

Automatic Sash Holders

and save labor, lumber and money. *Send for trial set ($1 prepaid) stating approximate weight of sash, or our circular*

Automatic Sash Holder Mfg. Co.
46 Church St., New York.



Carpenters'
ADZE

White Adze cost a little more. Sure, they do; but if they will last two or three times as long and you can do your work in about half the time, they are worth it, aren't they?

Isn't This So?

If you get hold of a tool that just suits you in every way—it's worth what you have paid, isn't it? Well, we can suit you. Ask for our Carpenters' Catalogue.

The L. & I. J. White Co., 100 Perry St., Buffalo, N. Y.

ORIGINATORS
OF
SASH CHAIN

The Standard for over 35 Years. Capacity of chain plant 35 miles per day. Many imitators, no equal. Used by the United States Government for over 30 Years.



The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

COPPER CABLE SASH CHAIN



Thomas Morton
245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS

For Suspending Heavy Doors Gates, Etc.

All of SUPERIOR QUALITY



CHAMPION METAL SASH CHAIN

is also given on estimating the amount of slate required for a roof. The company is prepared to furnish on quick demand all slate products and to give a certificate with its roofing slates which states that the material contained therein is "genuine Bangor slate."

Summer School of Manual Training

The courses in manual training pursued at the summer school of the Bradley Polytechnic Institute, Peoria, Ill., are set forth in a pamphlet which is being sent out by the management. The courses are planned with special reference to the needs of teachers, and specialization in the fundamental processes of a variety of handicrafts suitable for schools. The courses include the use of wood working machinery, furniture making, wood finishing, pattern making, etc.; architectural, mechanical machine and freehand drawing; the study of interiors; cement construction, the laying of floors and sidewalks, making of molds, properties and methods of use, etc. The course is from June 19 to July 21.

TRADE NOTES

W. E. Dunn Mfg. Compny, 416 Twenty-fourth Street, Holland, Mich., is offering to send to builders a copy of its free book on concrete machinery. It is not exactly a catalog because it gives the cost of making a number of concrete products, such as porches, chimneys, fence posts, building blocks, etc., and also tells about the profits in drain tile making for farmers. A copy of the book will be sent free to anyone sufficiently interested to apply to the company.

Amalgamated Roofing Company, 431 South Dearborn Street, Chicago, Ill., calls attention to the fact that its Nu-Tile Asphalt Shingles are fire-resisting and that this fact has given architects and contractors specifying and using them a reputation which has resulted in many houses being protected by this form of roof covering. The shingles are made in red, moss green and white colors, are waterproof, fire-resisting and durable.

The Louden Machinery Co., 5402 Court Street, Fairfield, Iowa, points out that its special garage door overcomes many of the objections which are often urged against sliding and swinging doors, and which is sufficiently low in cost to command instant attention. The Louden door is hinged in three parts and follows a very short curve in the track so that no waste space is created either inside or outside the building.

One of the latest candidates for popular favor in the way of a wallboard is what is known as the "Black Rock," a stiff four-ply board having what is described by the company as a "moisture-repellant black center." It is made by the Black Rock Wallboard Company, 1525 Ontario Place, Black Rock, N. Y., and the claim is put forth that the well sized, smooth "sanded-like" surface of Black Rock needs less paint—no priming coat being necessary—and retains that "fresh-painted" look which is so satisfactory to the house owner. The company has issued a booklet relating to this wallboard which it will send free with sample of the material to any architect or builder who may make application for it.

U. S. Mineral Wool Company has removed its New York City office to 280 Madison Avenue.

Clinton Wire Cloth Company, 51 Parker Street, Clinton, Mass., has issued an interesting book entitled "Successful Stucco Houses," a copy of which any reader of THE BUILDING AGE may obtain free. Another booklet which cannot fail to interest is entitled "Clinton Hand Book on Lath and Plaster."

The April issue of the house organ of the North Western Expanded Metal Co., 904 Colony Building, Chicago, Ill., contains some interesting information regarding building trade conditions in various cities of the country. The Bulletin is illustrated by halftones of various prominent buildings in which metal lath has been used for exterior or interior plastering and these are accompanied by a few lines of description pointing out important architectural features. Expanded Metal

(*Continued on page* 104)

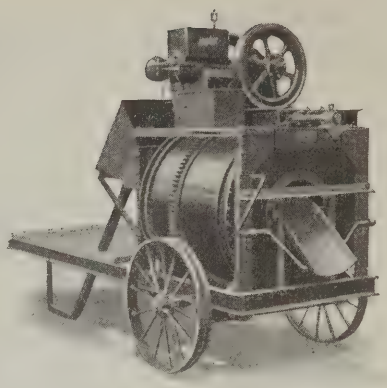
A Little Fellow for Big Jobs as Well as Small Ones

If you want a concrete mixer that you can easily transport from job to job—any job—The Archer is your machine.

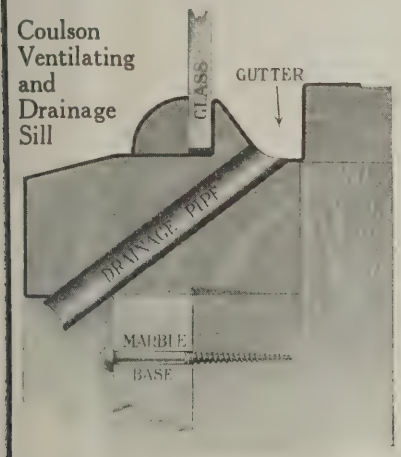
It's a small mixer, but as sturdy and adaptable as they make 'em.

One man and an Archer can turn out at least 50 cubic yards of concrete per day; perfect batches, every one of them! He can wheel it to the work all by himself.

May we send description and prices?



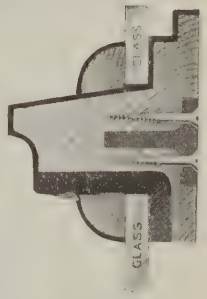
The Archer Iron Works, 2440 W. 34th Place, Chicago, Ill.
Established 1891



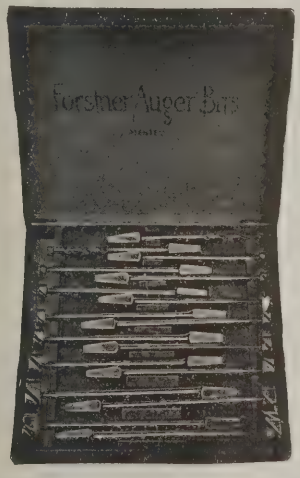
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J. W. Coulson & Co., Columbus, O.
107 West Spring St.

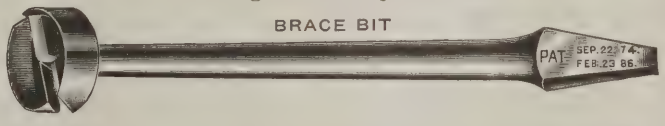


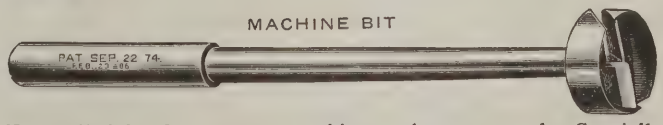
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THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

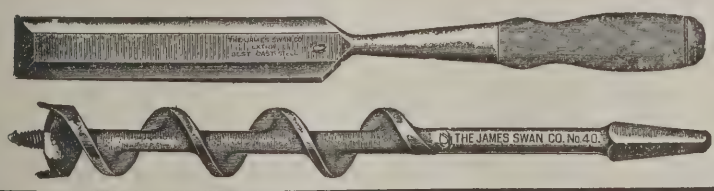




Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wook working and against difficult grain and knots. Special prices in full sets.

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On Chisels, Bits, Gouges, Augers, Draw Knives, Screw Drivers, Etc. High Grade Mechanics' Tools known to all good workmen.

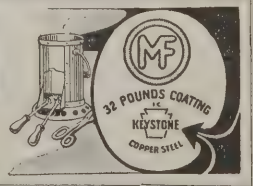


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THE JAMES SWAN COMPANY, Seymour, Conn.
Awarded the Medal of Honor on Mechanics' Tools at the Panama-Pacific Exposition.



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Carefully manufactured from **KEYSTONE COPPER STEEL**—highest quality plates obtainable; accurately resquared, uniformly coated—stamped "Keystone Copper Steel" in addition to brand and weight of coating, as indicated by MF brand. Use Apollo-Keystone Galvanized Sheets, Etc.

Manufactured by AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

Build With Stucco But Give a Backbone of

SYKES
Expanded Cup Metal Lath

No Furring Strips Required



Stucco Buildings are becoming more and more popular because of their economy and durability. Many builders are converting frame houses into handsome stucco houses by overcoating.

Sykes Metal Lath is the logical material to use with stucco—either building or overcoating work—because

It Gives More Weight for same gauge than other metal laths—therefore more strength and durability.

It requires less mortar.

It keys perfectly.

Sykes Expanded Cup Lath requires no furring strips and so saves 5 to 10 cts. a sq. yd. in building costs.

The builder experienced in metal lath work will be careful to judge a metal lath not by gauge alone but by gauge and weight. Sykes Expanded Cup Metal Lath being cut from wider strands than others has more weight. This is a very important advantage.

Best for interior as well as for exterior work—*Sykes*

Approved by U. S. Government for Post Office Work

The Sykes Booklet—Complete Specifications for Stucco on Metal Lath—is sent free on request. Will show you how to build better and save. Free sample of Sykes Expanded Cup Metal Lath. Write us today.

Sykes Metal Lath and Roofing Co.
494 River Road, Warren, Ohio

Lath, as is well known, is so constructed as to conform to the strictest fire resisting requirements and can be shaped to follow the distinctive designs of an architect without trouble or excessive expense in labor.

The Standard Scale and Supply Co., has removed from its old location in Water Street to 1631 Liberty Avenue, Pittsburgh, Pa., where it will enjoy commodious quarters more in keeping with the requirements of its growing business. It has also moved its New York City office to 145 Chambers Street.

Announcement is made that the Berlin Machine Works, Beloit, Wis., has changed its name to P. B. Yates Machine Company. The statement is made that ever since the business was founded forty years ago in the little Wisconsin town of Berlin, from which it took its name, considerable annoyance has been experienced through the adoption of this name by many other small concerns established in cities of the same name in various states. In the interest of its patrons and the good will and prestige enjoyed, the company has concluded to change its name as above, this change being confined to name only, as officers, capital and policy will remain as heretofore.

King Elevator Company, Inc., 397 Bedford Avenue, Brooklyn, N. Y., and Bridgeport, Conn., has recently issued from the press an illustrated catalog relating to the various lines of dumbwaiters, ash hoists, sidewalk and freight elevators which it manufactures. Special reference is made to the Simplex dumbwaiter which is said to be suitable for all classes of buildings and particularly so where a dumbwaiter of moderate cost is required. The company makes a specialty of high grade private house and investment work and all machines are built to order to fit each individual hatch and meet the requirements they are called on to perform.

The Automatic Sash Holder Mfg. Co., 46 Church Street, New York City, calls attention to the fact that its automatic sash holders being cheaper than sash weights, cord and pulleys, are calculated, in view of the tremendous rise in the price of iron, lead, zinc and other metals, to receive more than ordinary consideration on the part of architects and builders. The sash holders are referred to as being simple of construction and that it is only necessary to put a mortise in either the sash or the frame, insert the holders and the window can be raised and lowered at will. The devices can be installed wherever there are any pocket frames and are suited for economical window construction.

Two booklets upon doors which are being widely distributed by the Hyde-Murphy Co., Ridgway, Pa., are of special interest to the architect and builder. One describes the "no-warp" construction of doors made by it. The device used in keeping the joints together consists of a clamp made of spring steel with slightly convex faces and acute angle flanges, which engage corresponding grooves formed in back of parts to be joined together. When driven in place these clamps are invisible and exert a constant pressure on the edges so joined together, making a joint which remains tight under all changes of temperature or climate. The other booklet contains illustrations in color and prices of the various veneered doors which it manufactures.

"Ideal Ideas" is the title of a booklet which has been published for the purpose of showing the uses of Ideal concrete block construction. Reference is made to the advantages of concrete blocks and a brilliant array is presented of halftone engravings covering buildings of all kinds which have been erected by the use of Ideal blocks. Among the later pages of the booklet are shown some of the many forms of blocks which may be produced on Ideal block machines. The booklet is sent out by the Ideal Concrete Machinery Company, 1310 Monmouth Avenue, Cincinnati, Ohio, and although its name does not appear in connection with it, a panel at the bottom of the first page is left blank for the name and address of the customer to whom the company supplies the pamphlet in 500 or 1000 lots, thus giving the customer a better catalog at a lower price than he could

(*Continued on page* 106)

The Stiff 4-Ply Wallboard— Black Rock



Build Your Reputation on Black Rock

The last word in wallboard

AT LAST—HERE IS A WALLBOARD that will win the enthusiasm of every conscientious contractor. For Black Rock (in addition to being as-stiff-as-lumber) is the only wallboard with a *moisture-repellant black centre.*

As a man who knows lumber, you will recognize that the *veneer* process of combining the four plies, makes Black Rock the *stiffest* and *strongest* wallboard. That's why it looks, works and lasts like high-grade, kiln-dried finishing lumber.

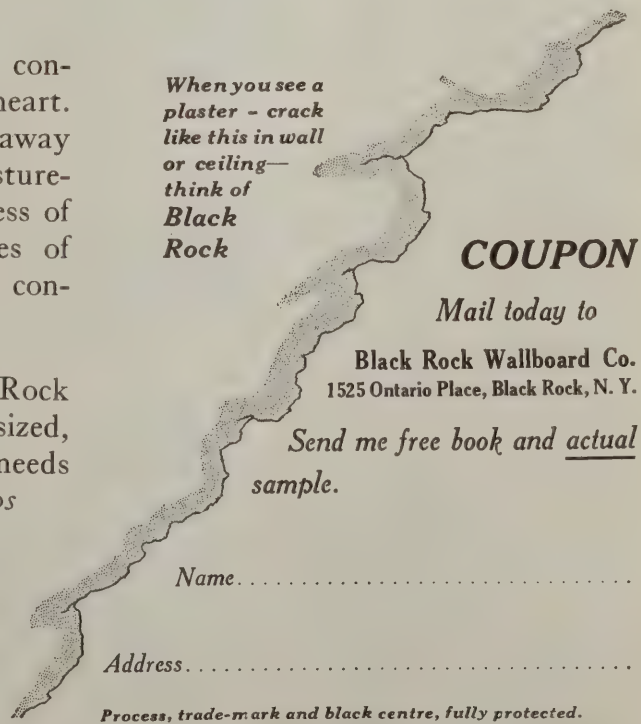
And here's good news for the progressive contractor who has his future reputation at heart. Black Rock will not warp, buckle, bulge, or pull away from the nails. For, in addition to the moisture-repellant black centre, the new scientific process of *moisture-proofing* the front and back surfaces of Black Rock removes the principal causes of contraction and expansion.

These are a few of the reasons why Black Rock pleases permanently. Moreover—the well sized, smooth, "sanded-like" surface of Black Rock needs less paint (no priming coat necessary) and *keeps* that fresh-painted look. The price of Black Rock will interest you.

BLACK ROCK WALLBOARD CO.
1525 Ontario Place
Black Rock . . . N. Y.

Black Rock Wallboard is something *new, different*—the very last word in wallboard.

It will boost your reputation as a builder. It will bring you "repeat" business. You cannot afford not to know about Black Rock. Send postcard, or coupon, for free book and sample.



When you see a plaster - crack like this in wall or ceiling— think of ***Black Rock***

COUPON

Mail today to

Black Rock Wallboard Co.
1525 Ontario Place, Black Rock, N. Y.

Send me free book and actual sample.

Name.....

Address.....

Process, trade-mark and black centre, fully protected.



What are *you* going to do?

IDEAL
CONSTANT SERVICE
POWER

Are you going to be content with your last year's equipment?

—or are you going to forge ahead and adopt for your 1916 work Constant Service Equipment?

Picture for a moment an engine with the latest improvements—

Simple in construction and requiring no skilled labor to operate—

With power to more than handle the work given it—

With strength to withstand the most exacting service—

With a pulsing, live action that insures "Constant Service" for your equipment—

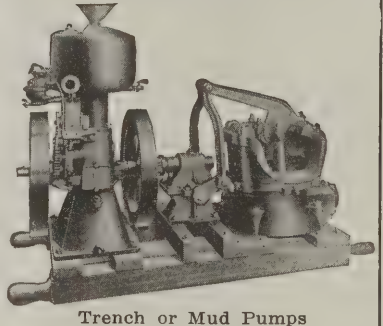
You can almost see the dollars of extra profit rolling in when you equip with—

Ideal Engines—the engine of "Constant Service"—the solution to your power troubles — the builder of profits.

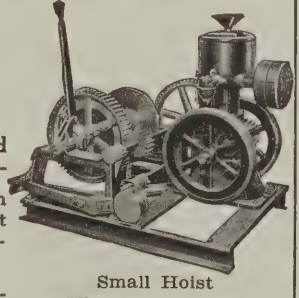
We offer you in **Ideal Engines** that which every contractor wants—power and plenty of it, when it's needed.

Why not equip with Ideal Power now?

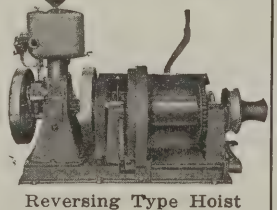
Our special booklet No. 516 will interest you.



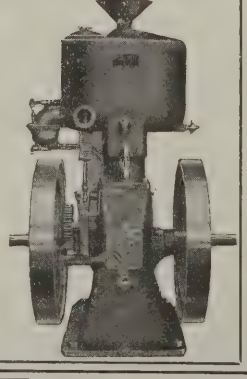
Trench or Mud Pumps



Small Hoist



Reversing Type Hoist



THE
IDEAL ENGINE CO.
R. E. OLDS, Chairman
Formerly
The Original Gas Engine Co.
East Kalamazoo Street
LANSING, MICH.

probably put out himself, not having the materials at hand to make up a booklet of this nature.

A booklet which contains just the kind of information desired by the carpenter and builder has been sent out by the Maple Flooring Manufacturers' Association, 801 Stock Exchange Building, Chicago, Ill. It is entitled "How to Lay and Finish Maple Floors," and describes the making of a good job from the delivery of the wood to the final touches given by the skilled workman in finishing a floor. The advantages of maple flooring are set forth in other booklets issued by the company and entitled "School-room Floors," "Ten Reasons Why" and "Individuality in the Home," the latter containing arguments likely to appeal to the owner or housewife. The booklets also touch on beech and birch flooring when that kind of a finish is desired.

The Walter Concretile Mfg. Company plans to establish a plant in Fremont, Ohio, for the manufacture of roofing materials. It is stated that the company will occupy quarters in the present plant of the Fremont Waterproofing Company.

The fence question is often a perplexing one, and in order to aid in its solution a booklet containing illustrations and prices of some of the many fences which it manufactures has been issued as a guide by the Wright Wire Company, Worcester, Mass. The company states that "Excelsior Rust-Proof Fences" are made entirely of large wires unweakened by binds, wraps or twists. Each joint has a patent steel clamp holding the wires in a vise-like grip. It is stated that the fence is galvanized after making, by dipping the entire fabric in pure molten zinc, thus rendering it rust-proof.

"Garage Doors" is the principal subject treated in the April number of *Doorways*, the house organ of the Richards-Wilcox Mfg. Co., Aurora, Ill. The article discusses various types of hangers made by the company and there is also a clever joke column to amuse the casual reader.

B. H. Fontaine has recently opened an office for the practice of architecture at 313 Louisville Trust Building, Louisville, Ky., and is desirous of obtaining catalogs and samples from manufacturers of building materials.

Edwin B. Bennett, for over twenty years Western manager of the Eagle White Lead Co., Cincinnati, Ohio, died on Thursday, March 30, at his residence, 1724 Park Avenue, Chicago, at the age of 71. He has resided in Chicago for fifty-nine years. He is survived by a widow and four sons.

Lewis Brothers, Lima, Ohio, have completed plans for a one-story factory building 110 x 150 ft., the erection of which will be started at once. The plant will make veneer doors and other interior finish.

The increased cost of materials and labor in house painting makes it necessary for the painter to raise his prices if he expects to show a profit at the end of the year is the intimation contained in a recent issue of the *Carter Times*, the house organ of the Carter White Lead Co., West Pullman Station, Chicago, Ill. A sample paint and labor estimate is given and there is also a table showing how to figure overhead charges and their constituent parts. The company realizing the importance of proper publicity is offering slides for use in motion picture houses, mailing cards and letters for use in "Clean-up and Paint-up" campaigns, etc., free to painters using Carter paints.

Decorative Concrete

Our processes for the exact and permanent reproduction in concrete, of marble, granite and onyx effects in all colors, are what we have to sell.

Write us for particulars and prices.

ART STONE CO., Box 500, Waynesboro, Pa.



The Building Age

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The Ives Window Ventilating Lock

A Safeguard for Ventilating Rooms, allowing windows to be left open at the top, the bottom, or both top and bottom, with entire security against intrusion.

Descriptive circular mailed on application

THE H. B. IVES CO.

SOLE MANUFACTURERS NEW HAVEN, CONN.

Samson Spot Sash Cord



Made of extra quality stock, carefully inspected and guaranteed free from the imperfections of braid and finish which destroy common cords so quickly.



The Spots on the Cord, in any color, are our trade mark, used only with this extra quality.

Samples and full information gladly sent.

Samson Cordage Works
Boston, Mass.



Stained with Cabot's Shingle Stains
Upjohn & Conable, Architects, N. Y.

The Shingles and Timbering

of this beautiful Old-English residence are colored and preserved with

Cabot's Creosote Stains

The shingles are warmer than English tiles, and the coloring is much softer and richer, owing to the texture of the wood and the deep velvety tints of the stains. The stained timbers, in old smoky browns and dark grays that bring out the grain, harmonize perfectly and weather out beautifully. Cabot's Stains are artistic, inexpensive, lasting, and the Creosote preserves the wood.

Cabot's Quilt

30 Times Warmer than Building Paper

Quilt is a thick matting of dead air spaces and one layer is warmer than 30 layers of common papers. Used at the South Pole by Scott and near the North Pole by McMillan, with perfect success. The best sound-deadener.

You can get Cabot's Stains and Quilt all over the country. Send for samples and names of nearest agents.

Samuel Cabot, Inc., Mfg. Chemists, Boston

2133 Broadway, New York **24 W. Kinzie St., Chicago**

Cabot's Conservo Wood Preservative, Stucco Stains, Brick Stains, Damp-Proofing.

TRADE MARK **NICE** REG. U.S.A.

Liquid Wood Fillers

were the first on the market. By reason of the steady maintenance of superiority they are recognized as first in quality today. This recognition comes from the journeymen on the job, who stand by the material that enables them to do the most work right in the least time. It comes from the contractor or painter who stakes his future on satisfied customers and satisfactory profit. It comes from the live dealer who knows the value of goods that keep drawing his customers back for more. It comes from architects and property owners who judge by results in service. You can depend on "Nice" wood fillers and varnishes—to assist materially in boosting your business.

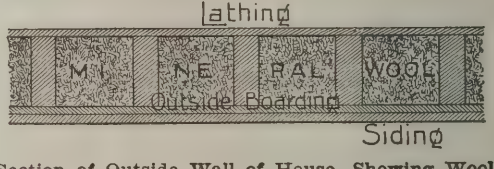
Write today for price list and other literature.

Eugene E. Nice

Manufacturer of

Varnishes, Fillers, Paints, Stains, Enamels, Colors.

Philadelphia, Penna., *and* Camden, N. J.



Section of Outside Wall of House, Showing Wool Between Studding.

Mineral Wool for Building

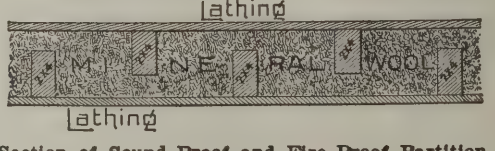
Mineral Wool has superseded all other materials used for similar building purposes because it does "a great work at little expense." A house lined with Mineral Wool has an indestructible, fire-proof and vermin-proof guard; it protects the entire household. In the winter time it keeps the cold air out, facilitating proper heating and economy in fuel. In the summer it keeps the heat out.

This material, being of fibrous, inelastic composition, acts as a deadener and muffles all sound. It is considered the best insulator material on the market, making it a perfect refrigerating machine.

Mineral Wool makes life-long friends of all its users. If you are skeptical as to its power, let us demonstrate. We can prove all claims. Write us to-day.

U. S. Mineral Wool Co.

280 Madison Ave., New York
(Cor. 40th St.)



Section of Sound-Proof and Fire-Proof Partition. Can be used for outside walls also.

The Building Age

NEW YORK, JUNE, 1916

A House at Wheaton, Ill.

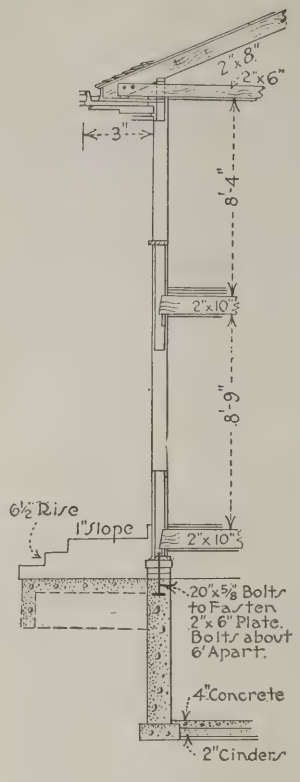


General Appearance of the Residence of G. F. Allum at Wheaton, Ill., and Designed by Architect Albert E. Colcord of Chicago, Ill.

IN the Middle West the sun parlor has rapidly come to the front as an attractive feature in modern house and flat building construction. This is especially true in Chicago and its suburbs, and many instances could be cited where carpenters and builders have been called upon to remodel houses along this line built five or ten years ago. Porches of this character of the enclosed type are unquestionably more in vogue than those having no protection whatever from the elements, and this means that the occupants are able to utilize them the year round. Where such buildings are heated by steam or hot water comparatively little trouble has been experienced in supplying sufficient radiation to offset the additional heat losses incurred by the installation of so much extra glass surface. Some sun parlors are built with brick sides and a glass front, but investigation has shown that those exposed on all sides are the most popular.

This improvement has therefore inaugurated the establishment of an additional cosy room which is not only an architectural feature, but one that the owner fully appreciates. Irrespective of climatic conditions, it affords an excellent view in three different directions. Of course, these sun parlors vary in their dimensions, but a typical one may be said to have sufficient proportions to house two or three chairs and a small table. Specifications invariably call for direct communication of the sun porch with the living room, and where a southern exposure is possible, a well arranged home is flooded with an abundance of natural light during the entire day.

Among the most attractive suburban homes around Chicago having this interesting feature as

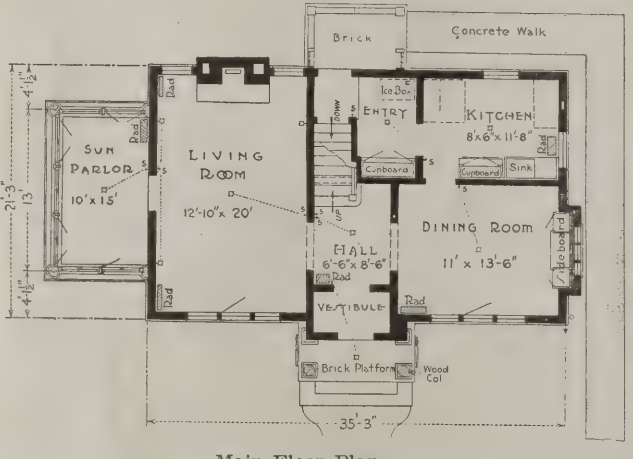


Section—Scale ⅛ In. to the Foot

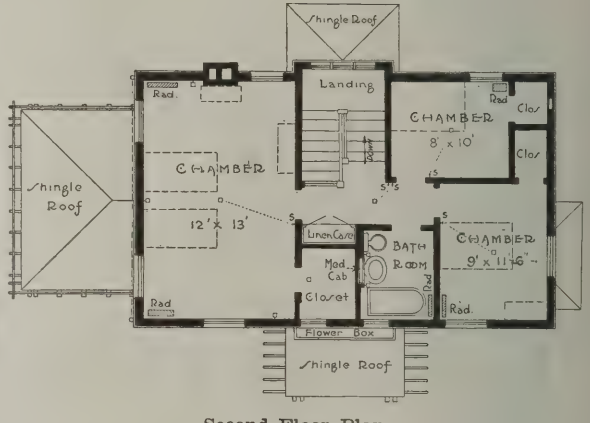


Front Elevation of the House Showing the Window Treatment and Sun Parlor at the Left

Scale 3/32 In. to the Foot

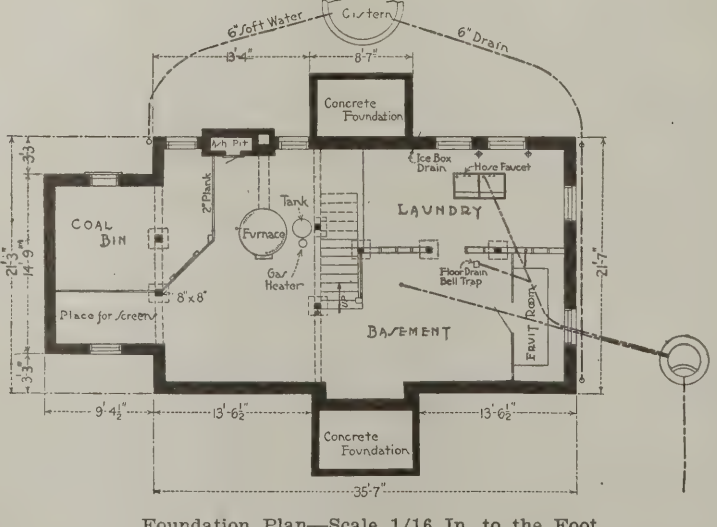


Main Floor Plan

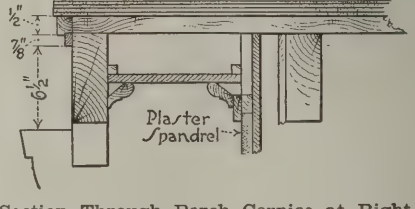


Second Floor Plan

Scale 1/16 In. to the Foot



Foundation Plan—Scale 1/16 In. to the Foot



Section Through Porch Cornice at Right Angles to the Pitch Looking Toward the Double Beam—Scale ¾ In. to the Foot

A House at Wheaton, Ill.—Plans, Elevation and Miscellaneous Constructive Details

well as other pleasing points in the exterior decorative treatment and interior arrangement, are those to be found in Wheaton, Ill. The one here illustrated is a practical example of what may be accomplished in the Middle West for an expenditure not exceeding $5,000, involving the construction of a home of ample proportions to accommodate the needs of an average family.



A House at Wheaton, Ill.—Detail of the Main Entrance

It will be observed from the pictures of the exterior that the use of wooden columns and the introduction of pergola effects has been carried out with a harmony that adds materially to the artistic appearance. This effort has been brought to a successful conclusion without increasing the cost of production to an alarming extent, resulting in an extremely well balanced building. A careful examination reveals the fact that particular attention was paid to every detail, and the trellis work provided around the front and rear entrances, together with the flower box directly over the main entrance, is evidence of the truth of this statement. The use of a smooth, white stucco as a finish coat creates a uniform color scheme throughout which blends with the green shingles and the dark red brick.

The house faces east, and the sun parlor has a southern exposure. The building is approximately 36 ft. long and 22 ft. wide, while the sun parlor is 10 ft. by 15 ft., being exposed on all sides.

The front entrance gives access to a small vestibule, in which twelve coat hooks have been provided. An inner door separates the vestibule from the hall, and to the right and left of the latter are to be

found the dining room and living room, respectively.

The stairs leading to the upper quarters are splendidly lighted by three long narrow windows. These are revealed in the exterior view taken from the rear, and the reader may pass on the advantages of these facilities by focusing his attention directly over the rear entrance. It will also be noticed on the first floor that a small recess to the right of the stairs has been provided for a telephone table and a chair.

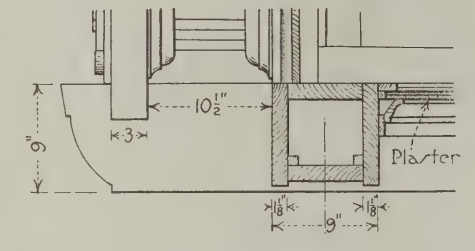
The living room is 14 ft. wide and 20 ft. long, extending the full width of the house. At one end is a cozy brick fireplace flanked on either side by a stationary window. The height of the ceiling is 8 ft. 9 in. The mantel above the fireplace projects 9½ in. from the wall and is 3½ in. thick. The hearth is built from 6-in. quarry tile.

The sun parlor is separated from the living room by a door having eighteen panes of glass, three to a row. When the sun is shining, therefore, a steady stream of light comes through even as far as the hall, brightening this section of the house very considerably. There is installed in the sun parlor a total of fourteen windows, distributed four to each side and six facing south. A radiator in one corner makes this room a comfortable one during the colder months.

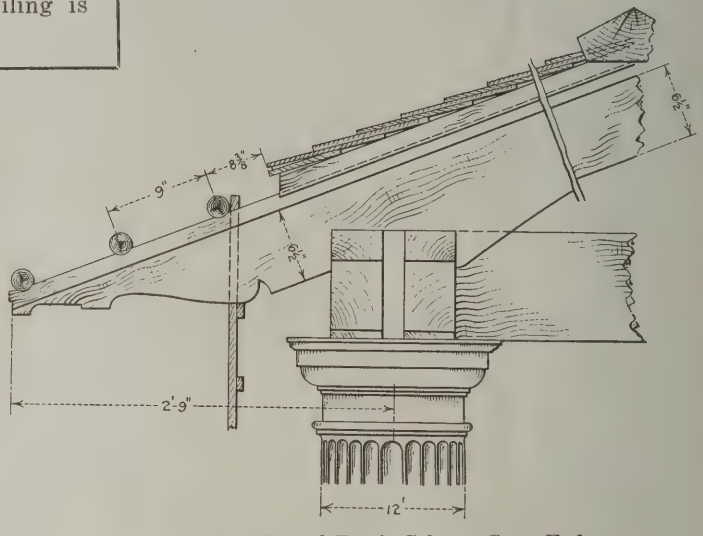
At the northeast corner of the residence is the dining room, 14 ft. 6 in. long by 11 ft. wide. There is a built-in buffet and in the recess above are three windows.

The kitchen, adjacent to the dining room, has its fixtures distributed around three sides, leaving plenty of room in the center in which the domestic may operate. A large built-in cupboard for china-ware has beneath it seven drawers, for a variety of purposes. Next to it is an enameled iron sink, with draining board, and reference to the floor plan will show the location of the gas range and a "Hoosier" kitchen cabinet. In an adjoining entry is a large cupboard, with four shelves, and space for an icebox.

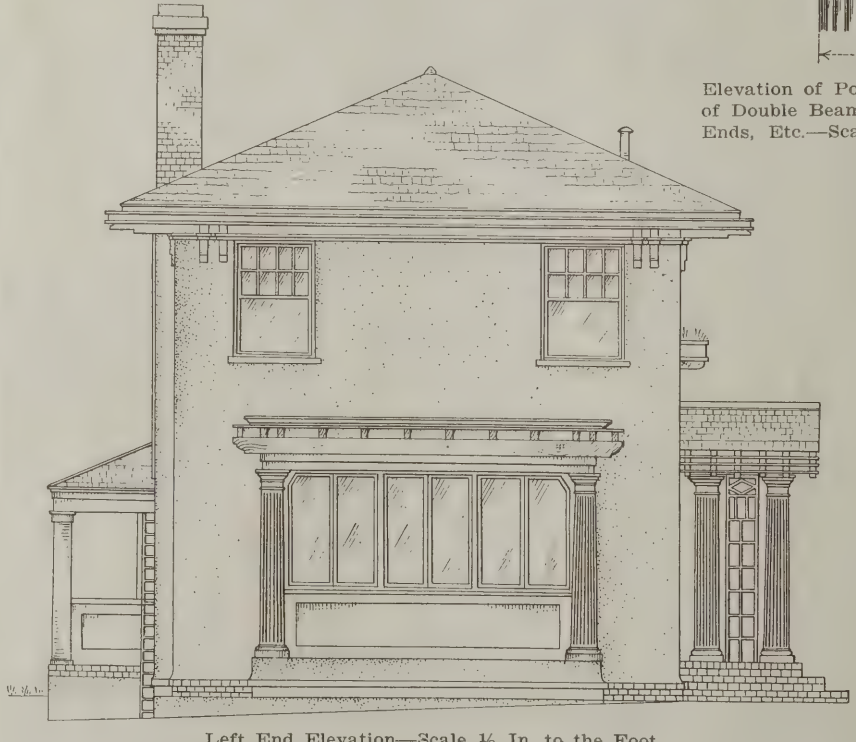
On reaching the hall on the second floor a large linen closet confronts the visitor. The arrangement on this floor includes three bedrooms and a bathroom. The largest of these has the same dimen-



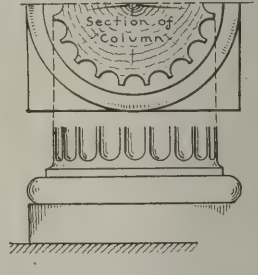
Section at Center Through Beam over Porch Column Looking Toward Double Beam at the Side—Scale ¾ In. to the Foot



Elevation of Porch Column Cap; End of Double Beam and Detail of Rafter Ends, Etc.—Scale ¾ In. to the Foot



Left End Elevation—Scale ⅛ In. to the Foot



Elevation of Column Base with Cross-Section of One-Half of the Fluted Column—Scale ¾ In. to the Foot

Miscellaneous Constructive Details of a House at Wheaton, Ill.



View in the Dining Room Looking Toward the End Containing the Built-in Buffet



A House at Wheaton, Ill.—The Living Room with Sun Parlor at the Left

sions as the living room and is directly over it. A roomy closet, 4 ft. 6 in. wide and 7 ft. long, is lighted by a window on the east side. The two remaining bedrooms are situated at the northeast and northwest corners, and are respectively 9 ft. x 11 ft. 6 in. and 8 x 13 ft. The bathroom is 6 ft. wide and 8 ft. long, replete with modern fixtures arranged on one side.

The footings and basement walls of the house are of concrete, composed of one part Portland cement, three parts torpedo sand and five parts crushed stone. Anchor bolts are built in the top of the wall for securing the sills on which the studding rests. The outside of the basement walls has been plastered with waterproofed Portland cement.

A concrete floor in the basement, is laid on a 3½-in. foundation and consists of one part Portland cement, two parts Lake Shore sand and four parts crushed stone. The half-inch finish coat contains equal quantities of Portland cement and torpedo sand. The work is laid true and to an even surface, and rests on a 4-in. bed of cinders.

The joists, girders, etc., are of No. 1 yellow pine, set 16 in. on centers. The first and second floor joists are 2 x 10 in., the ceiling joists and the rafters are 2 x 6 in., the valleys are 2 x 8 in., the studding and plates 2 x 4 in., and the ridges 1 x 8 in. The bridging is made of sound 2 x 4 in. material. Both tiers of floor joists have two rows of bridging the entire length of the house. The rafters have a 2 x 6-in. collar beam for each rafter. Headers and trimmers are double, well framed and spiked together.

The stud partitions are No. 1 yellow pine and all bearing partitions have plates top and bottom.

All rough underflooring is No. 2 common 6-in. fencing, dressed on one side, laid close and nailed double to every joist. On the first floor this is covered with heavy tar paper on which is placed the finish floor of 2¼-in. face white oak except in the kitchen and rear entry where it is 2½-in. face maple. The second story underflooring is covered with one layer of H. W. Johns-Manville Co's Keystone hair insulator, with red building paper on one side and felt paper on the other, laid with the latter side up. The finish floors are of white oak including that of the bathroom.



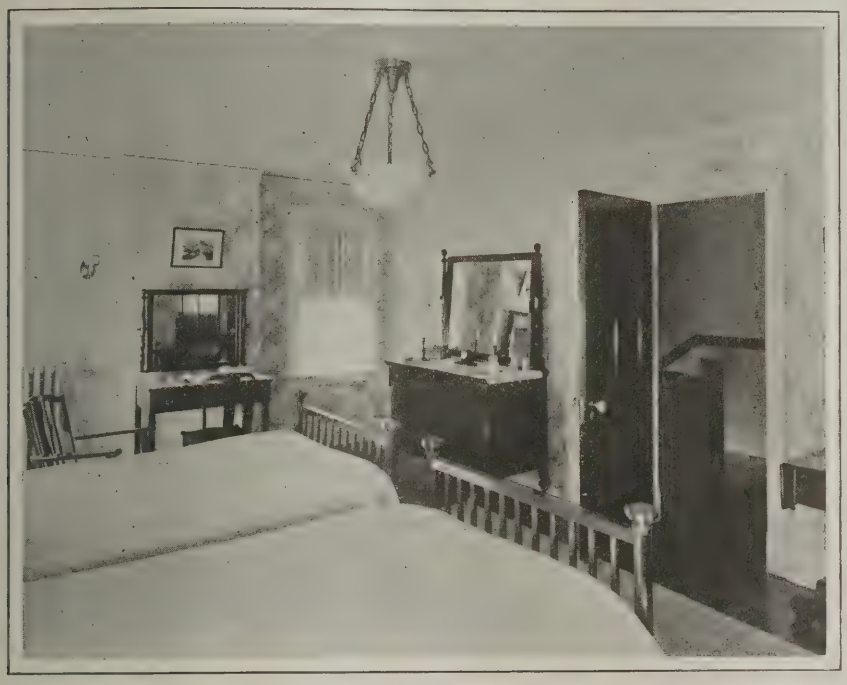
A House at Wheaton, Ill.—View in the Kitchen Showing Gas Range, Sink and Cabinet

The sides of the house are covered with 6-in. matched fencing, dressed on one side, over which was placed tar building paper. Crimped metal furring strips were then attached and "Kno-Burn" expanded metal laths fastened on horizontally, so that the length of the sheet runs across the furring. The dip of the strand is set down and inward to form a perfect key. The edges of the sheets are lapped ½ in., and the lath is applied to the furring strips every 4 in., using 1½-in. staples.

In producing the stucco finish to be seen in the pictures of the exterior "Stonekote," made by the Garden City Sand Co., Chicago, Ill., was used throughout, it consisting of the company's waterproofed plastic marble float application and is three-

coat work. The exterior surface of the chimney stack was treated in a like manner.

The various roofs are covered with Star A white cedar shingles, securely attached with galvanized iron nails and exposed 4½ in. to the weather. Before being applied they were dipped three-quarters their length in Cabot's light green creosote stain.



A House at Wheaton, Ill.—View in One of the Bedrooms with Glimpse of Stair Hall at the Right

The finish work in the house includes wood cornices for the living and dining rooms, sideboard, china closets, linen closets, mantel shelves, medicine cases, cabinet with drawers in the rear entry and kitchen, and picture molding for each room.

The entire first floor is trimmed in red oak, and the second floor has birch trim. The doors are of white oak on the first floor and birch on the second. Inside doors are 1¾ in. thick. The front and vestibule doors and those in the rear kitchen and basement are 2¼ in. thick. All closets are equipped with two rows of 10-in. shelves. Beaded strips are extended all around 4 in. wide, and furnished with cast iron wardrobe hooks every 8 in., attached with screws.

The walls and ceilings of the first and second floors are plastered two-coat work. The living and dining rooms, vestibule and hall have a gray sand finish, while the balance of the house has a plaster of paris smooth white finish. The brown coat consists of clean sharp lake sand and live quick lime, well slacked and strained, and good cattle hair, well picked apart and mixed with a good quality fiber.

The exterior woodwork of the house is painted two coats, exclusive of the priming coat. All first floor finish received two coats of varnish, rubbed to a flat finish with pumice stone and oil. The door and window sill in the bathroom were stained for mahogany and then varnished two coats. The second floor birch trim received three coats and one of white enamel. The bathroom has four coats of white enamel on the walls and ceiling, no paint being applied beneath the enamel.

The oak floors are filled light and have two coats of Pratt & Lambert's floor varnish. Maple floors received two coats of linseed oil. One coat was applied as soon as the floor was laid, while the final application was given on completion of the building. The inside of all sash is painted or stained to match the room which it faces, two coats of varnish being applied to the stain.

The bathroom fixtures include a "Superior X" closet, a "Norwood" lavatory and a 5-ft. "Corona" bathtub, of types made by the L. Wolff Manufacturing Co., Chicago. Installed in the basement is a two-part Durostone laundry tray, 33 in. high. The kitchen sink is 20 x 30 in., and is 33 in. high.

The sheet metal work is made of No. 26 gage American Ingot iron. The downspouts from the main roof are 5 in., and are carried to the sewer. They are secured to the building by means of metal rings, leaving a space of 2 in. between the wall and



Rear View of the House at Wheaton Showing the Sun Parlor and Outside Chimney

the spout. One downspout has been installed to take care of drainage from the sun parlor roof. The flower box on the front of the building is lined with American Ingot iron, and three drains are provided, as shown on the accompanying elevations.

In the basement is to be found a Detroit Jewel No. 12 B. gas water heater for supplying hot water to the fixtures in the summer time. Proper connections have been made to a 40-gal. tank.

A cistern has been installed in the yard to accumulate soft water, and the plumbing system is so cross connected that either soft water or city water may be used.

Reference to the picture of the rear of the house shows a coal chute beneath the west side of the sun parlor, made by The Majestic Co., Huntington, Ind.

The building is heated by a hot water system, there being a total of 612 sq. ft. of direct radiation, distributed into 11 units. The living room and the main bedroom have radiators installed at the east and west ends, as indicated on the floor plans. The remainder have but one radiator. The equipment is guaranteed to heat the building to a temperature of 70 deg. when the temperature outside registers 10 deg. below zero. A Spencer boiler has been provided having a 1200 sq. ft. rating and made by the Spencer Heater Co., Scranton, Pa. A Honeywell system of heat regulation has also been installed.

The building is piped for gas and wired for electric lighting. In the latter connection it has been the practice to install a fixture in the center of each room, but in the living room and bedrooms brackets have been provided around the walls at advantageous points.

The house here described is occupied by G. F. Allum, 704 Gary Avenue, Wheaton, Ill. Plans and specifications were prepared by Architect Albert E. Colcord, 117 North Dearborn Street, Chicago, Ill., and the construction work was carried out by A. Johnson of Glen Ellyn, Ill.

Value of Slate Sold in 1915

The total value of slate of all kinds sold in the United States in 1915 was $4,958,515, according to the United States Geological Survey. This was a decrease of 13 per cent compared with 1914. The sales of roofing slate in 1915 were 967,780 squares, valued at $3,745,934, and of mill stock 4,576,112 square feet, valued at $819,672. Blackboard material and school slates decreased 31 per cent.

Several producers have reported to G. F. Loughlin, of the Geological Survey, that during the last three months of the year conditions began to improve and that early in 1916 prices for slate of all kinds were more encouraging than at corresponding times for several years. At present many of the quarries can greatly increase their output to keep pace with any increase in demand.

In Maryland and New York there were substantial increases in the value of the slate sold, and in Virginia a small increase; in the other States—Maine, New Jersey, Pennsylvania, and Vermont—there were decreases.

The total number of operators, which had decreased from 171 in 1913 to 157 in 1914, continued to decrease in 1915 to 148. Virginia was the only State in which the number increased—from 7 to 8. Of the States producing roofing slate, Maryland gained not only in quantity and value, but the price per square decreased in each State. Pennsylvania and Vermont, which together yielded more than 86 per cent of the total value of roofing slate, decreased in quantity, value, and price per square. Only Maine, Pennsylvania and Vermont reported sales of mill stock in 1915, and in all these States both quantity and value decreased.

The value of slate exports, which was $226,413 in 1913 and $139,125 in 1914, was only $46,137 in 1915, the lowest recorded since 1895. England, which has heretofore been the largest user of American slates, did not import any in 1915; neither did Belgium, Denmark, Germany or the Netherlands. The failure of the United States to export a large amount under these conditions indicates a world-wide decline in building operations during 1915.

Next to the United States, Great Britain and France are the chief slate-producing countries, and Belgium ranks fourth. Other countries reporting an output of slate are India, Germany (Bavaria), and Canada. As all these countries were directly or indirectly involved in the European war during 1915, both their production of slate and their demand for slate doubtless greatly decreased. Canada's production, according to John McLeish, of the Canada Department of Mines, decreased from 1075 squares, valued at $4,837, in 1914, to 397 squares, valued at $2,039, in 1915.

Color Absorption of Light

In an interesting and instructive article dealing with hospital construction, Oliver H. Bartine tells in a recent issue of *Building Management* that recent tests by illuminating engineers show that light is absorbed by walls of different colors as follows:

White	18%
Chrome yellow	38%
Orange	50%
Plain deal	55%
Yellow	60%
Pink	64%
Emerald green	82%
Dark brown	87%
Vermilion	88%
Blue green	88%
Cobalt blue	88%
Deep chocolate	96%

Coating for Blue Print Paper

As a result of the great increase in the price of potassium-ferri-cyanide, or red prussiate of potash, which is extensively used as a coating material for blue-print paper, an economical method of preparing the substance has been devised by the U. S. Department of Agriculture. Particulars relating to this method have been sent out by the Department accompanied by a blue print of the apparatus for use in connection with the preparation of potassium-ferri-cyanide from potassium-ferro-cyanide.



Some Aspects of Modern Shingling*

The Straightedge, the Chalkline and the "Gauge and Hatchet" Methods of Laying Shingles

By Edward H. Crussell

WE will now consider some of the methods of laying shingles. One of the oldest methods is that in which a straight-edge is used. At first the workman used any straight-edge that happened to be handy, and then some one thought of making a straight-edge the exact width the shingles were exposed to the weather. This did away with the measuring for each movement of the straight-edge, as all that was necessary was to keep the lower edge of it flush with the lower edge of the course just laid, and the upper edge would then be in line for the next course. The straight-edge was used. It is faster than the straight-edge method, but has many disadvantages compared with the next method to be considered, which is usually known as the "gauge and hatchet method."

This is the method used by the professional shinglers in the Western States, of whom some wonderful stories of big day's work have been told.

The hatchet used is either the lathing hatchet, Fig. 9, or the boxmaker's hatchet, Fig. 10—usually the latter because frequently the shingler changes his profession to that of boxmaker during the fruit season. One will *never* see the professional shingler

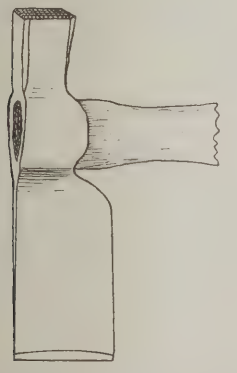


Fig. 9—A Lathing Hatchet

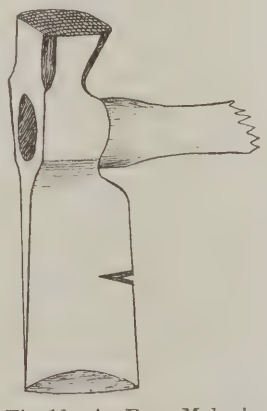


Fig. 10—A Box Maker's Hatchet

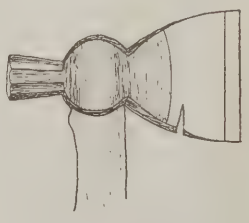


Fig. 11—The Ordinary Shingling Hatchet

Some Aspects of Modern Shingling—Various Kinds of Hatchets

usually fastened in place, and quite frequently the shingles were put on by two workmen, one laying and the other nailing. This is almost the slowest of all methods of laying shingles, though it may still be found in use.

The next method was that of the chalk-line. In the original method a line was snapped for each course, but eventually some one discovered that if two lines were snapped it was possible to carry two courses at once because the second line could be easily seen through the spaces between the shingles of the first course. This method is still extensively with the hatchet that is designated by the tool manufacturer as a shingling hatchet. This instrument is pictured in Fig. 11, for no other reason than that the novice may know what it looks like and fight shy of it.

Fig. 12 shows a combined hatchet and gauge. This has been placed on the market in the last few years, and although the writer has never used one, it appears to him to be a satisfactory tool.

Fig. 13 shows the hatchet gauge that is in general use, and Fig. 14 its appearance when applied to the hatchet. This gauge is about ¾ in. diameter, with a slot ⅛ in. wide. It can be applied to any of the box or lathing hatchets, and of course can be

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adjusted to more positions than the gauge shown in Fig. 12, which is an advantage when the width of the courses must be varied, as in finishing up at the ridge or spacing between window heights on the side walls.

This ease of adjustment is also a disadvantage, as the gauge is liable to move from position with the continual use of the hatchet, and to prevent this movement something more than the set screw is needed. Probably the best method is to drill a small depression in the hatchet for the end of the set screw at those points where the gauge will be most frequently used and keep careful watch of the gauge when using it in other positions. The gauge can be quite firmly fixed by making the set screw half a turn too tight before applying the gauge to the hatchet and then driving it on with a hammer from the upper edge. This method, of course, takes away some of the ease of adjustment.

And now having distributed our shingles, built our seat and fixed our hatchet, we are at last ready to start work. The first course of shingles usually projects over the edge of the roof boards about 1 in. and must always be a doubled course or two thick-

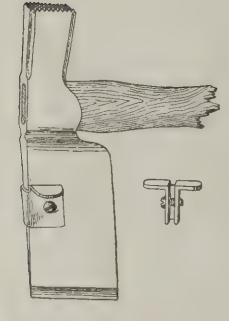


Fig. 12—A Hatchet with a Fixed Gauge



Fig. 13—The Hatchet Gauge

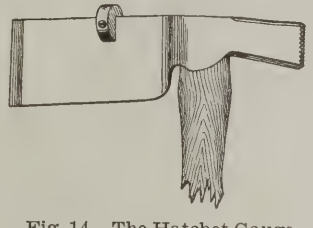


Fig. 14—The Hatchet Gauge in Place

Some Aspects of Modern Shingling

nesses of shingles. It may be laid by first fixing a shingle at each end of the roof with the correct projection and then stretching a line to which the butts of the other shingles are laid. On a long roof it may be necessary to fix one or more intermediate shingles, to which the line is also fastened, and sometimes on old buildings that are out of line it may be necessary to adjust these shingles by eye instead of giving them all an equal projection over the roof boards.

Each shingle is fastened with two nails, which are driven about 2 in. above the line of exposure so that they may be covered by the following course. Some authorities advise placing the nails so that they may be covered by two courses. This would mean that with shingles laid 4½ in. to the weather the nail must be driven 9½ or 10 in. from the lower edge, and the greater the exposure the further up must the shingle be nailed. In the opinion of the writer, any advantage gained by this method is more than offset by the tendency the shingles have to curl and buckle when nailed so far from the butt. It is better to nail them lower down and then be careful that none of the joints in the course above come directly over a nail. Shingles nailed at the lower position are twice as securely fastened as those nailed at the upper. This is easily proven, because the nails driven in the course that is being laid go through the course below in about the same place as is advocated by those who wish their nails covered with two courses of shingles.

The joints of the shingles should be broken for three courses, which means that no joint in any one of three courses should be directly in line with another. To accomplish this result with random width shingles is not so difficult as might be supposed. Each joint should be broken at least 1 in., which means that no joint in any course should be nearer than 1 in. to a joint in the courses next to it.

We have already stated that the professional shingler often prefers to get right on to the roof instead of working the first courses from a scaffold, and Fig. 15 is a photo showing one of these fellows just commencing his job. It will perhaps be noticed that he breaks open his bundles as he uses them,

(To be continued)

"Floor for Doctors" A New Skyscraper Wrinkle

An interesting architectural development in connection with recent office building construction is the setting aside of a floor especially equipped for the exclusive use of physicians, surgeons and dentists. A feature of this kind is found in the ninth floor of the Third National Bank Building in Springfield, Mass., which was designed and erected by Hoggson Bros. of New York City, who have made an extensive study of the specialized building question. The floor in the building named has been fitted up as offices for one, two, three or any number of associated practitioners with operating rooms, laboratories and rest rooms, as may be required, opening from the reception room used in common.

Here the associated doctors may have the combined service of a staff of assistants consisting of nurses, a secretary and a maid, which under the ordinary arrangement of offices is often prohibitory by reason of the expense. There is provided gas, electric light and power, compressed air, and special basins with hot and cold water under pedal control. In each dental laboratory are suitable workbenches, compressed air, gas, electric light and power outlets, hot and cold water and other necessary devices and equipment.

Another Co-Operative Apartment House

Operations have just been commenced upon the construction of a fifteen-story co-operative apartment house and studio building on the corner of Sixty-seventh Street and Central Park West, the cost of which, including the land, will approximate $1,000,000. Efforts will be made to create a record in constructing the building so that it may be ready for occupancy by Oct. 1 of the present year. The work will be done by the William J. Taylor Company, 5 East Forty-second Street, New York City, which has erected all the studio buildings in Sixty-seventh Street and is now engaged in the erection of the Hotel des Artistes, on the north side, next to the corner. The new project is the first important improvement on the south side of Sixty-seventh Street and is also the first of the studio buildings to have an unobstructed park view.

Features of Roof Gutters and Leaders*

Their Character—Shape of Pipes—The Drainage—Forms of Gutters for Hanging on Eaves

IF the plumber is the householder's personal devil his first entrance to the home must have been by way of the gutter and rain pipe. The English use of "leads," for flat roofs, and of "plumber" (or lead worker) for roofer, points to the progress of lead from roof drains to drain pipes within houses. Doubtless it was the truly demoniac behavior of joints stopped with lead in letting in rain which first gave the wretched plumber the reputation he has never since lived down.

Development of Plumbing

But the development of external and internal plumbing has been in quite divergent directions. Inside, the proudest spot of the house is likely to be the gleaming nickel and porcelain of the sanitary equipment, grown from "exposed" to what might be called "displayed" plumbing; while outside the tendency is all toward disposing gutters and drain pipes and spouts as unostentatiously as possible. The gargoyle has fallen into innocuous desuetude.

But why gutters or rain pipes at all? The principal reason is clearly the protection of walls from discoloration, or disintegration from the dissolving acids which may be contained in the rainwater. Then the foundations and flower beds or lawns need to be sheltered from the dropping or spattering from the edge of the roof.

The character of gutters and leaders depends first of all on the type of roof itself, whether flat or pitched. The main motive of the pitched or inclined roof is, of course, to shed water, ice, or snow. It is usually made up of small units such as shingles or tile, articulated for expansion and contraction in extreme variations of climate. If metal roofing is used it must be articulated for expansion both of itself and of the underlying roof structure. For flat roofs lead and copper have been given up for asphalt and pitch, which, if somewhat protected from oxidation, have a long life of viscosity and consequent impermeability. The better roofs of this type are also covered on top by brick or tile.

Disuse of Lead for Gutters and Pipes

Why have we not gone on using lead for gutters and rain pipes, as in the days when leadworking was a traditional art, and ornamental gutters and leader heads the pride of the house owner? First of all, because of the cost, which would now be prohibitive. Moreover, lead is extremely heavy, and pipes burst under sag or freezing, and are corroded by time. Other materials available are solid copper, and thin sheet-iron or steel protected by paint, tar, tin, zinc, or copper coating. But no metals are immune from corrosion. Rainwater carries dissolved dust and acid gases—sulphuric acid from coal smoke and carbonic anhydridge from the air—and these will attack lead, copper or iron, forming sulphates or carbonates, in addition to the oxides formed by the oxygen of the air, the action of the whole accelerated by dampness.

Materials Governed by Cost

The practical choice of material is governed by the relative cost, together with relative immunity from attack, and the conclusion is that we take either galvanized iron (zinc-covered sheet iron) or solid copper. Zinc, as regards iron, is electro-positive, whereas copper, tin, lead and nickel are electro-negative. That is, if a minute pore reveals the iron under its zinc coating, the zinc in its dilute acid bath of rainwater, which sets up electric current, goes into solution and particles rush over to this exposed point of iron and unite with it, thus continually recreating the continuity of the coating. The other metals, being electro-negative, retreat, on the contrary, from the edge of any such exposed point, the iron going into solution and being deposited in its turn on the tin and the point going deeper. In simpler terms, tin, copper and nickel-plate are ruled out as drainage pipes because of pitting; zinc prevents pitting.

When Price Is Not a Consideration

If price had not to be considered, nickel or copper would be an ideal material, because nickel is to copper as zinc is to iron. But in present conditions solid copper and galvanized iron are the practical choices. Galvanized iron has a life of six to eight years. Painted outside, the life of galvanized iron would be increased 50 per cent., but an inside coating would very soon be washed and scraped away. Solid copper resists disintegration indefinitely, because the first surface corrosion adheres fast and itself forms a hard, protective coating.

The initial cost of copper is three times that of galvanized iron, including labor of erection; and this difference is somewhat increased by the practice of having copper work specially designed for each building, which both means more work and more material; while galvanized iron is used mostly in ready-made units. Fifty dollars will buy the gutter and leader equipment for the average house.

Cypress for Gutters

Cypress wood for gutters, if well chosen and seasoned, has a long life; but the difficutly is to secure it so that it will not twist, or the joints open, in stress of freezing, drying out, etc. For a damp, warm climate, such as that of our South, it does very well.

Masonry in the form of a dish-shaped channel in the cornice is also occasionally used for gutters.

As to the shape of pipes, it is clear that the circular section will carry more water for a given weight of metal than the square. The square form is,

*Benjamin A. Howes in *Country Life in America.*

however, of better appearance against a wall, both as regards its own shape, and in fastening. Each section may carry a lug by which it is fastened to the wall. The next upper section fits inside it, and the whole joint is covered by a ship-shape wall fastening in the form of a metal band. Few people think that such a leader is anything but a single integral tube. This arrangement is especially desirable in that it allows easy inspection or repair of parts, and provides for expansion or contraction of the sections, and movement of the walls. Expansion is further met by longitudinal corrugations, as well as by the square form itself, which can take care of even a solid ice formation without breaking. The fact that cast-iron pipes cannot thus expand is one reason for not using them for leaders, except where they run down inside the building.

Setting Leaders

All leaders should set into a length of cast-iron pipe slightly above the ground level; first, because a thinner metal leader will rust from continual dampness there; and secondly, because the greater mechanical strength of the cast-iron pipe protects against blows, such as that of a lawn mower. The leader should on no account be free at its lower end, for the spouting of water is destructive to grading, may form ice on paths in winter, or even back up in the leader itself by the formation of an icicle.

Failing ability to connect with a public sewer or drainage system, these rainwater drains, in the case of small buildings on sandy soil, will take care of themselves at 15 or 20 ft. away from the house, if turned into a dry well; in sandy strata two buried barrels full of stone or gravel will serve. Otherwise a dry well of larger capacity will be required, or better still, the drain can be made to discharge at the surface at some convenient place. It is not desirable to turn rainwater into a private sewage disposal system, where it is liable to wash out the raw sewage.

Gutters for Hanging on Eaves

Gutters may take various forms for hanging on eaves. Far the simplest is the semicircular gutter, with edges rolled for stiffness, hung under the eaves with heavy galvanized iron or cast bronze brackets. Or there may be one gutter inside the other; the inside one tipped to bring water quickly to the leader opening, the outside perfectly horizontal to preserve appearance. In no case is the gutter concealed in the roof structure desirable. It is difficult to make right in the first place, and almost impossible to repair, and it is dangerous because of the great variations of its own expansion and contraction from that of the roof structure proper. The simple hung gutter is preferable, especially as it may be made to look like part of the cornice.

For flat roofs the leader head should be enlarged at the point where it leaves the gutter, to provide against the clogging of sticks. Otherwise the enlarged head may be placed against the wall, with a gooseneck leading down to it. Sometimes a copper wire basket protects the leader opening.

It requires more than a century for a cedar tree to grow large enough to yield a thirty-foot telephone pole.

Schedule of Ventilation Standards

In the report of a committee appointed by the American Society of Heating & Ventilating Engineers to prepare a schedule of minimum ventilation requirements applying to public and semi-public buildings, we find the accompanying table which is likely to prove of interest to architects and heating engineers. The requirements are based on minimum floor space per occupant, minimum cubic space per occupant, minimum hourly air supply per occupant, rules governing air distribution, temperature regulation, heat sources, provision for mechanical exhaust where required, reduction and control of excessive temperature and humidity. The standards set by this committee are as follows:

Class of Building	Floor Space, Sq. Ft.	Cubic Space, Cu. Ft.	Air Supply, Cu. Ft.	Temperature Range, Degs. F.
Theaters	6	90	1,200	60—72
Auditoriums	6	90	1,500	60—72
Court Rooms	6	90	1,500	60—72
Primary schools	12.5	150	1,800	60—72
Schools and colleges	15	18	1,800	60—72
Factories	25	250	1,500	60—72
Manual training	25	250	1,500	60—72
Work rooms	25	250	1,500	60—72

Air Distribution.—The distribution and temperature of the air supply to be such as to allow the maintenance of required temperature without uncomfortable drafts or any draft lower than 60 deg. F. The carbon dioxide determination to apply as a test of proper air supply and distribution. The maximum allowable carbon dioxide content not to exceed ten parts in ten thousand parts of air.

Temperatures.—The temperature of air in occupied rooms in all classes of buildings to be not less than 60 deg. F. nor more than 72 deg. F. during periods when artificial heat is required.

Heat Sources.—Any source of heat which does not contaminate the air supply nor conflict with local requirements of the departments of health, fire, electricity, or building, may be used both for warming air supplied ventilation and for heating by direct radiation.

Mechanical Exhaust.—Where required on account of dust, fumes, gases, vapors, fibers, or other impurities being generated or released, mechanical exhaust systems are to be provided of proper design and to be operated as required to remove such impurities.

Excessive Temperature and Humidity.—Where excessive temperature or humidity occurs as a result of the location or the nature of the work done, or processes employed, provision shall be made for the reduction and control of such excessive temperature and humidity.

Unify Building Laws

Believing it evident that the peninsula south of San Francisco is facing a great building boom, the two trustees of Burlingame, Hillsborough and San Mateo, Cal., have arranged for a joint meeting to provide for the enactment of uniform building ordinances.

Arrangement of Sliding Partitions

The Accordion Folding Door Partition Which Is One of the Three Principal Types—Various Details

By E. J. G. Phillips*

THE accordion folding door has proved itself a valuable asset to the up-to-date church and Sunday-school room. Its use has made the separate class room possible with the minimum expense and it can usually be applied to old buildings with little difficulty as well as to new buildings. The large number of churches which are being remodeled and fitted with this type of door bear witness to the foregoing statement. Fig. 10 is the plan of a large Sunday-school room showing the extensive use of this type of partition. The interior view, Fig. 11, showing a number of accordion partitions, gives a good idea of the appearance of the doors in actual use.

All of the doors can be folded to one side or they may be divided at the center and half the doors folded to each side of the room, as in Fig. 12.

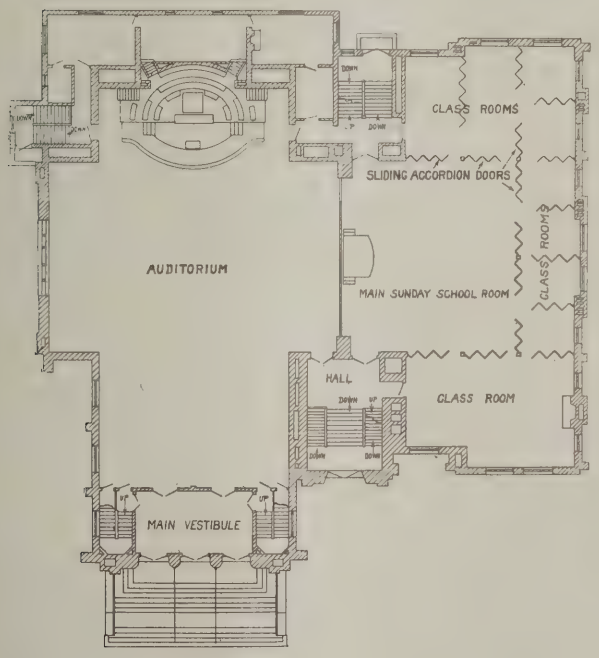


Fig. 10—Plan of a Large Sunday School Room



View Showing Accordion Doors Closed

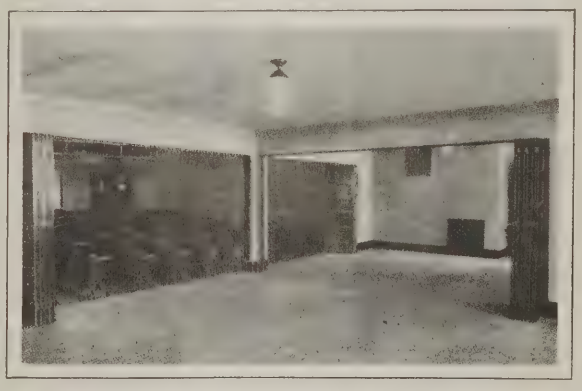


Fig. 11—The Use of a Number of Accordion Partitions, the Doors Being Shown Open

Arrangement of Sliding Partitions—Use of Accordion Doors

When opened, the doors fold compactly against the wall and no pocket is required. A half door is required adjoining the jamb toward which the doors fold. By reference to Fig. 17 it will be noted that where all the doors fold to one side one half door is required, but when divided at the center and folded toward both sides two half doors are necessary. A sufficient number of doors should be used so that no door will exceed 3 ft. in width. The half door, so-called, is really less than half the width of the full size doors. The exact width of doors is determined by four conditions: First, the distance from the center of the hinge pin to the edge of the door; second, by the thickness of doors; third, by the number of doors, and, fourth, by the style of hanger used.

The correct dimensions may be readily obtained by using the following fomula, which provides for the minimum projection of the hinge pin from the door, thus allowing the doors to fold as compactly as possible, and it is based upon the use of a well-known make of door hangers.

$$\text{Width of full-size doors} = \frac{\text{Clear width of opening "H"} + \text{"B" (from table Fig. 13)}}{\text{number of full size doors} + \frac{1}{2}}$$

$$\text{Width of half doors} = \frac{\text{width of full size door}}{2} \text{ "B"}$$

If the doors are to fold toward both sides, as in the upper plan, Fig. 12, consider the distance from the center line of opening to jamb, as clear width

*Engineer Richards-Wilcox Mfg. Company.

of opening *H* and divide by the number of doors which are to fill this space.

As an example, consider an opening 12 ft. wide, *i.e.* the space which the doors actually occupy with four full size doors 1¾ in. thick and using loose pin butts. Adding *B* from the table, which is 1⅛ in. to 12 ft., equals 12 ft. 1⅛. or 145⅛ in. This divided by 4½ equals 32¼, the width of each full size door. Dividing this by 2 equals 16⅛ in. Subtracting 1⅛ in. from 16⅛ in. equals 15 in., the width of the half door.

All the full size doors must be exactly the same width, and the sides must be exactly parallel and at right angles with the top and bottom. Special care in regard to these details, as well as in locating all the butts so the hinge pins will be exactly the

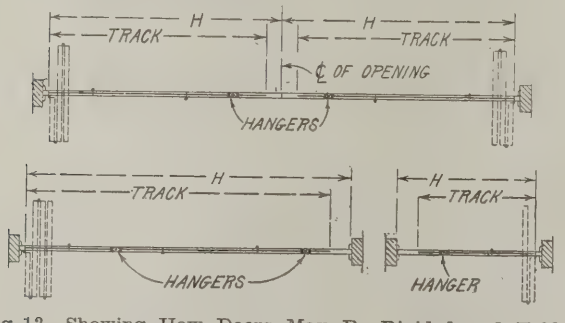


Fig. 12—Showing How Doors May Be Divided and Folded to One Side

in the sizes listed are considered suitable for ordinary wood doors of the given thickness, but for extra high doors or doors constructed of materials which considerably increase their weight, a larger size door hanger should be used, and this necessitates the use of larger butts, as given in the table in the line corresponding with the hanger to be used. In calculating the width of the doors, the quantity *B* should be taken from the same line in the table in which the size of butt is given and not from the line which gives the thickness of the door.

Flat surface hinges may be used if desired so long as the size door hang listed for given thicknesses of doors is followed and the hinges are of such dimensions that the space between the doors when folded is not less than that given in the table, Fig. 13, for tight pin butts. The general run of surface hinges will meet this requirement. In using larger hangers than those listed for the dif-

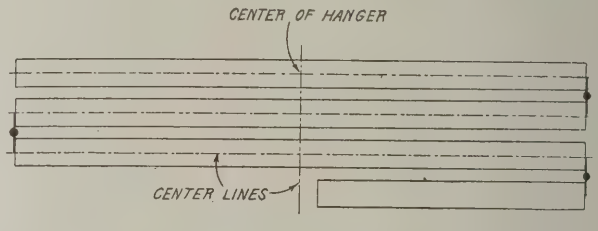


Fig. 14—Diagram for Properly Attaching the Hangers

Hanger Number	Thickness of Doors, Inches	Size of Butts, Inches	Distance from Center of Hinge Pin to Edge of Door "A"		Distance from Edge of Half Door to Center Line of Hanger Track "B"		Space Between Doors When Folded "C"		"E"—Distance from Top of Soffit to Bottom of Header, Inches	"G"—Distance from Top of Jamb to Bottom of Furring Strip, Inches
			Loose Pin Butts, Inches	Tight Pin Butts, Inches	Loose Pin Butts, Inches	Tight Pin Butts, Inches	Loose Pin Butts, Inches	Tight Pin Butts, Inches		
135–0	1⅜	3 x3	¼	¼	15/16	15/16	½	½	3⅛	3¼
135–01	1¾	3½x3½	¼	⅛	1⅛	1	½	¼	3⅞	3¼
135–1	2	4 x4	¼	¼	1¼	1¼	½	⅜	3⅞	3¼
135–1	2¼	4 x4	¼	⅛	1⅜	1¼	½	¼	3⅞	3¼
135–2	2½	5 x5	⅜	⅜	1⅝	1⅝	¾	¾	5¼	4¾
335	1⅜	3 x3	¼	¼	15/16	15/16	½	½	3⅞	3¼
335	1¾	3½x3½	¼	1/16	1⅛	15/16	½	⅛	3⅞	3¼
137–0	1⅜	3 x3	¼	¼	15/16	15/16	½	½	3⅛	3¼
137–1	1¾	3½x3½	¼	¼	1⅛	1⅛	½	½	3⅞	3¼
137–2	2	4 x4	¼	⅛	1¼	1⅛	½	¼	3⅞	3¼
137–2	2¼	4 x4	¼	1/16	1⅜	1 3/16	½	⅛	3⅞	3¼

Fig. 13—Table of Sizes and Distances for Placing Tight and Loose Pin Butts with Thickness of Doors

Arrangement of Sliding Partitions—Use of Accordion Doors

same distance from the edge of the door, will help greatly in producing a set of doors which will operate in first-class manner.

The use of doors having tongue and groove meeting stiles is recommended, as this will produce a much tighter partition. Doors of any standard thickness may be used, this depending upon their size and other special conditions.

Loose pin butts are generally used to hinge the doors together, but tight pin butts may be used if it is essential to fold the doors into the minimum space. As may be seen from the table, Fig. 13, the use of tight pin butts enables the hinge pin in some cases to be set very close to the edge of the doors because it is not necessary to make allowance for the removal of the hinge pin. No particular advantage is claimed for the loose pin butt except that it is somewhat easier to remove the doors. Butts

ferent thickness doors, surface hinges are impractical unless they are offset. The dimension *B* for calculating the width of the door will then be one-half the thickness of the door plus half the space between the doors when folded with the particular style of hinge used.

The hangers for accordion doors are of two general types, viz., two-wheel and four-wheel. The two-wheel hangers are designed for use on each full size door, but the four-wheel hangers are attached to each alternate door, beginning with the door farthest from the half door. Generally speaking, the four-wheel hangers are preferable. The plans in Fig. 12 show the correct number and location of four-wheel hangers for different numbers of doors. Half doors require no hangers. To attach the hangers properly, the doors should first be hinged together, following the suggestions previously given,

and then folded. Scribe a line across the center (considering width) of all the doors at the top, then draw center lines (considering thickness) on each door intersecting the first line, as in Fig. 14. To insure correct folding it is essential that the pendant bolt of all the hangers be located exactly in the center of the doors. Screw the hangers to the doors so the center of the pendant bolt will be located exactly over the point where the lines intersect.

It is sometimes desirable to have a passage or service door between the two rooms, and to accomplish this the two methods given in Figs. 15 and 16 are in use. Fig. 15 is a plan and elevation of a partition consisting of four full size doors and two half doors. The left half of the partition is hung as described above. At the right side, instead of attaching the hanger to *I*, the door farthest from half door, it is attached to the next door. The door *I* is then free to be used as an ordinary swing door. This method is the more common and gives a reasonable degree of satisfaction on narrow doors, but for wider doors it is subject to difficulty from the door dragging on the floor. It is also necessary to use a little more care when folding the doors, especially if floor guides are not in use. The second method, Fig. 16, can sometimes be used to good advantage, and is perhaps the better of the two where conditions permit. This plan and elevation shows two full size and one half door folding toward one side and a separate swing door hinged to the opposite jamb. This swing door is used for service independent of the folding doors. When the partition is opened, the service door is swung back against the side wall. The passage door in both cases locks to the adjoining folding door.

When all doors fold to one side, a length of track equal to the width of the opening, less 8 in., is required. The track, of course, might be run the full width of the opening, but this 8-in. space is convenient for inserting or removing the hangers from the track. When doors fold toward both sides of the opening a 1-ft. space may be left at the center between the two runs of track. This is clearly indicated in Fig. 12. When applying the trim a removable section of soffit should be placed directly below the place where the track is omitted, to give access to the end of the track without disturbing other members of the trim.

The track brackets are of a type which will allow the removal of the track if necessary, and should

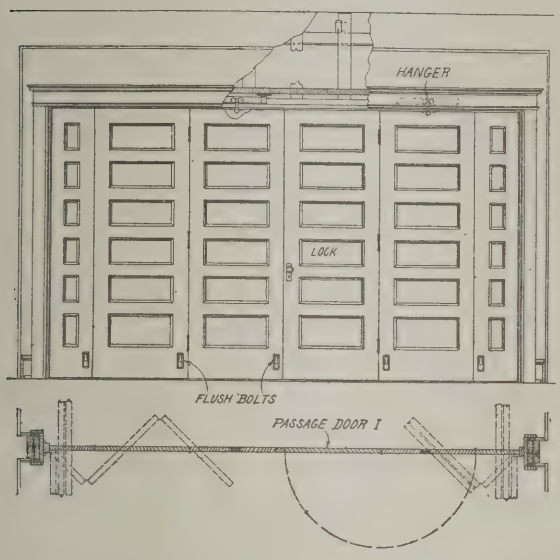


Fig. 15—Plan and Elevation of Partition Having Four Full-Size Doors and Two Half Doors

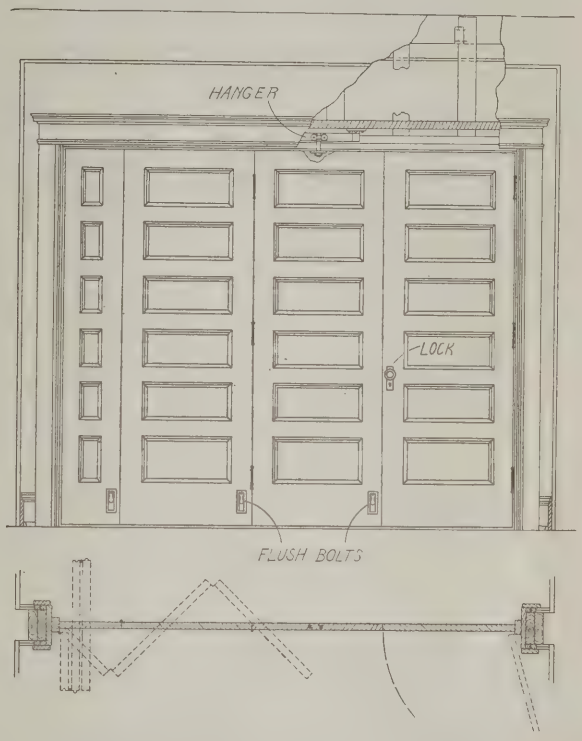


Fig. 16—Plan and Elevation Showing Two Full-Size and One Half Door Folding Toward One Side and a Separate Swing Door Hinged to Opposite Jamb

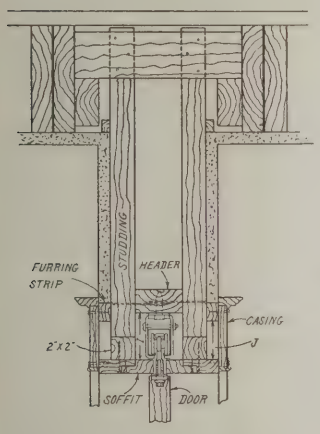


Fig. 17 — Cross-Section Showing Typical Over-Head Construction for Supporting Track

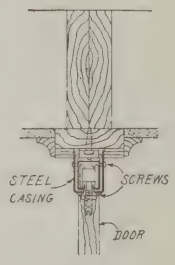


Fig. 18—Another Method of Construction Sometimes Used

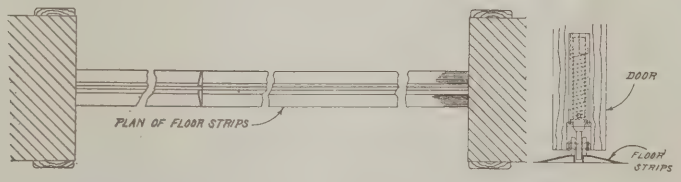


Fig. 19—Horizontal and Vertical Sections Showing Type of Floor Guides Often Used

Arrangement of Sliding Partitions—Use of Accordion Doors

be spaced from 24 in. to 30-in. centers excepting the first two or three brackets over the hall door. These should be spaced from 12 in. to 18-in. centers because of the additional load to be supported at this point when the doors are folded. Use the closer spacing of brackets for heavy doors.

A vertical cross-section, showing typical overhead construction for supporting track of a prominent make, is designated as Fig. 17. The conditions on each building, of course, determine to a large extent the particular structural arrangement. A header to which the track brackets are to be bolted is attached to the studding a suitable distance above the soffit. This dimension varies from 3⅛ in. to 5¼ in., according to the size of track used. A 2 in. x 4 in., as shown, is suitable for all except the largest size of track, which requires a 2 in. x 6 in. Head in the ends of the studs with a 2 in. x 2 in. and nail ⅞ in. x 1½-in. furring strips to the side of the studs a sufficient distance above the top of soffits to permit a screwdriver to be inserted between it and the 2 in. x 2 in., for the purpose of engaging the bolts through the side of the track brackets. The distance *J* will vary from 3¼ in to 4¾ in. The soffits and casings should be attached with screws, as shown in the illustration, so they may be removed without damage. This will be found convenient in case it should be necessary to remove the track. Head casing not less than 6 in. wide is required for the small sizes of track, but with the largest size the width of casing should not be less than 8 in. Allow ¼-in. clearance between top of doors and bottom of soffits.

Fig. 18 illustrates another method of construction which is sometimes used. In this the track brackets are attached directly under the ceiling or beam. The track is then inclosed with a steel casing which is attached to the brackets with small machine screws, the brackets having been previously tapped to receive the trim. The casing may be grained to match the woodwork or otherwise finished. This method is particularly adaptable when the partitions are applied to old buildings, but is also advantageous in new buildings because of the easy accessibility to all the fixtures.

A flush door bolt should be used at the bottom of each door, as shown in the elevation, Figs. 15 and 16. This gives required rigidity to the partition.

Floor guides similar to Fig. 19 are sometimes used. These serve to steady the doors in operation, but are not essential to a satisfactory installation. One should be located in the bottom of each alternate door in a line exactly under the center of the hanger pendant. When using floor guides, a type of flush bolt, which will not interfere with the guide strips, should be selected.

(*To be continued*)

Building Operations in Old New York

In 1877 there were 1432 buildings planned in New York City, estimated to cost $13,365,114; in 1869 the number planned was 2342, estimated to cost $40,352,058, and in 1909 the building construction planned involved an estimated outlay of $186,047,477, but the city in the last-named year embraced five boroughs instead of one.

Combination Club, Hotel, Office and Salesroom Building

A rather novel addition to the hotel district of the city of New York is to be erected in West Forty-second Street, just east of Broadway, on a plot 50 x 100 ft. in size and estimated to cost in the neighborhood of $1,000,000. It will be a combination club, hotel, office and salesroom building, twenty-five stories in height, and the tallest skyscraper in that section of the city.

In the basement and ground floor there will be a rathskeller and restaurant; on the second floor, conference and club rooms, and on eighteen of the upper floors there will be booths for trade exhibition purposes, also offices and reception rooms. The plans have been prepared by architects Helmle & Corbett, and the structure will be known as The Merchandise Hotel. It will be intended as headquarters building for American manufacturers and is being put up by the Bush Terminal Company. Branches of the new institution are to be established later at London, Petrograd and Moscow.

Supplement of Colonial Door Treatment and Modern Lighting Fixtures

We take pleasure in calling the attention of our readers to the added feature in this issue of the paper in the shape of a four-page supplement of heavily-coated paper, carrying finely executed halftone illustrations of special value to the young architect and the progressive builder, who are constantly being called upon for suggestions with regard to various features in connection with house design and equipment. Of the four pages in question, three are taken up with window and door treatment of the Colonial order, and represent examples of modern construction to be found in the vicinity of New York. The fourth page deals with lighting fixtures and bowls of Parian ware and of a character to command the attention of the artistic and discerning architect, builder and house owner.

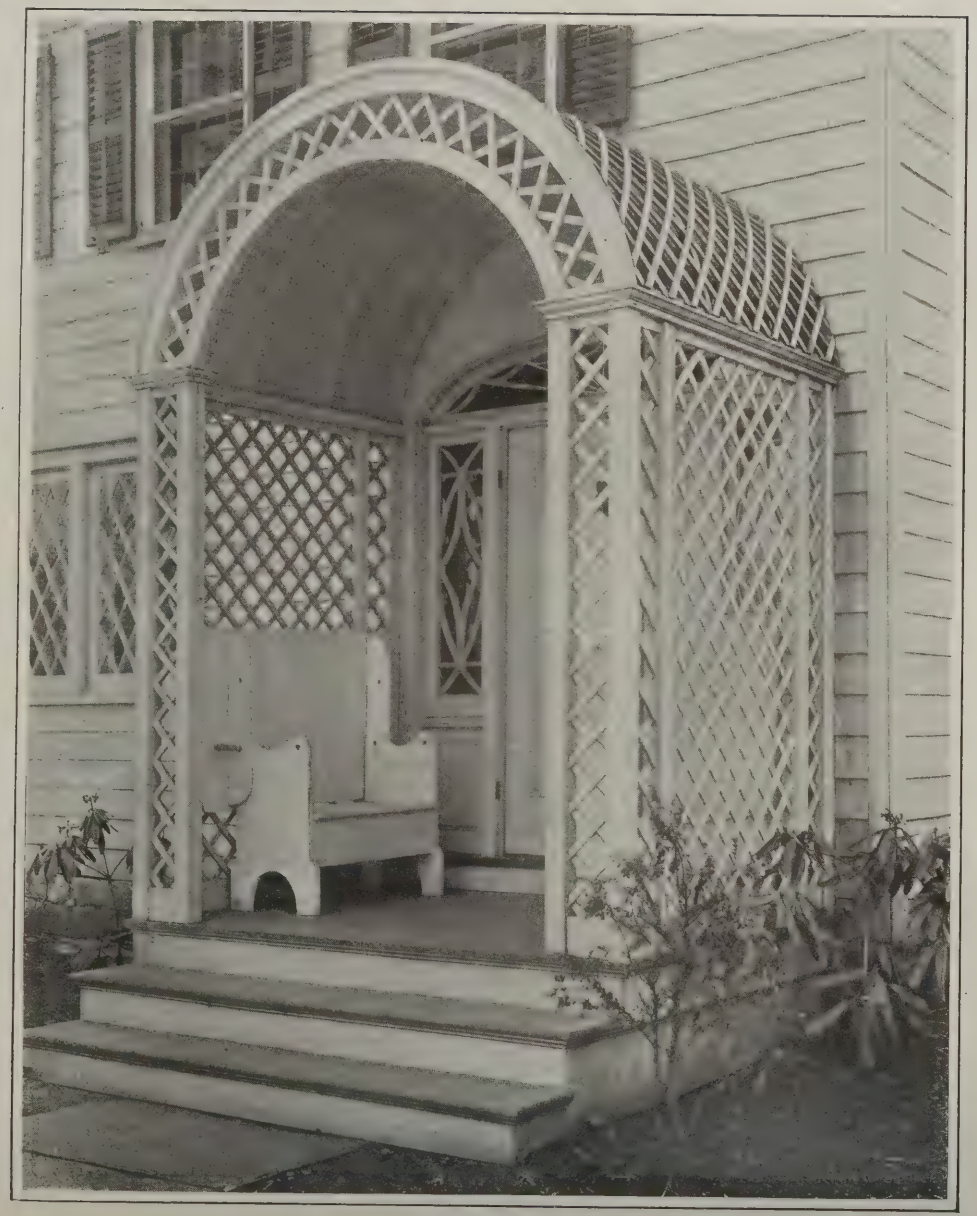
Instrument for Testing Floors and Walls of Buildings

A device intended to be used in testing floors, walls and columns of buildings in order to determine their safety and carrying strength has just been designed by Assistant Superintendent of Buildings D. E. Hooker of Seattle, Wash. It is known as an "Extensometer," and is of such sensitiveness that it measures the movements of buildings to the ten-thousandth part of an inch. In explaining the use and purpose of the instrument Mr. Hooker points out that when a floor or column in a building is loaded a slight movement takes place requiring a most delicate instrument to detect the change. When a floor slab is loaded the under surface stretches and becomes longer while the upper surface compresses and becomes shorter. By measuring the amount of the change and taking into consideration the kind and quality of the material and the amount of the load, it is possible to figure out the safe carrying capacity of the building. In reinforced concrete structures particularly this is important because in them weaknesses of construction are not otherwise readily discernible.





Some Practical Suggestions for the Architect and Builder in Door and Window Treatment





A Very Interesting Example of Colonial Doorway with Lattice Covered Porch and High Back Seat on Either Side of the Approach





Two Contrasting Entrances Treated in the Colonial Style of Architecture with Well-Balanced Window Effects



Some Striking Designs of Modern Lighting Fixtures in Gill Bros. Parian Ware

A Portable Collapsible Workbench

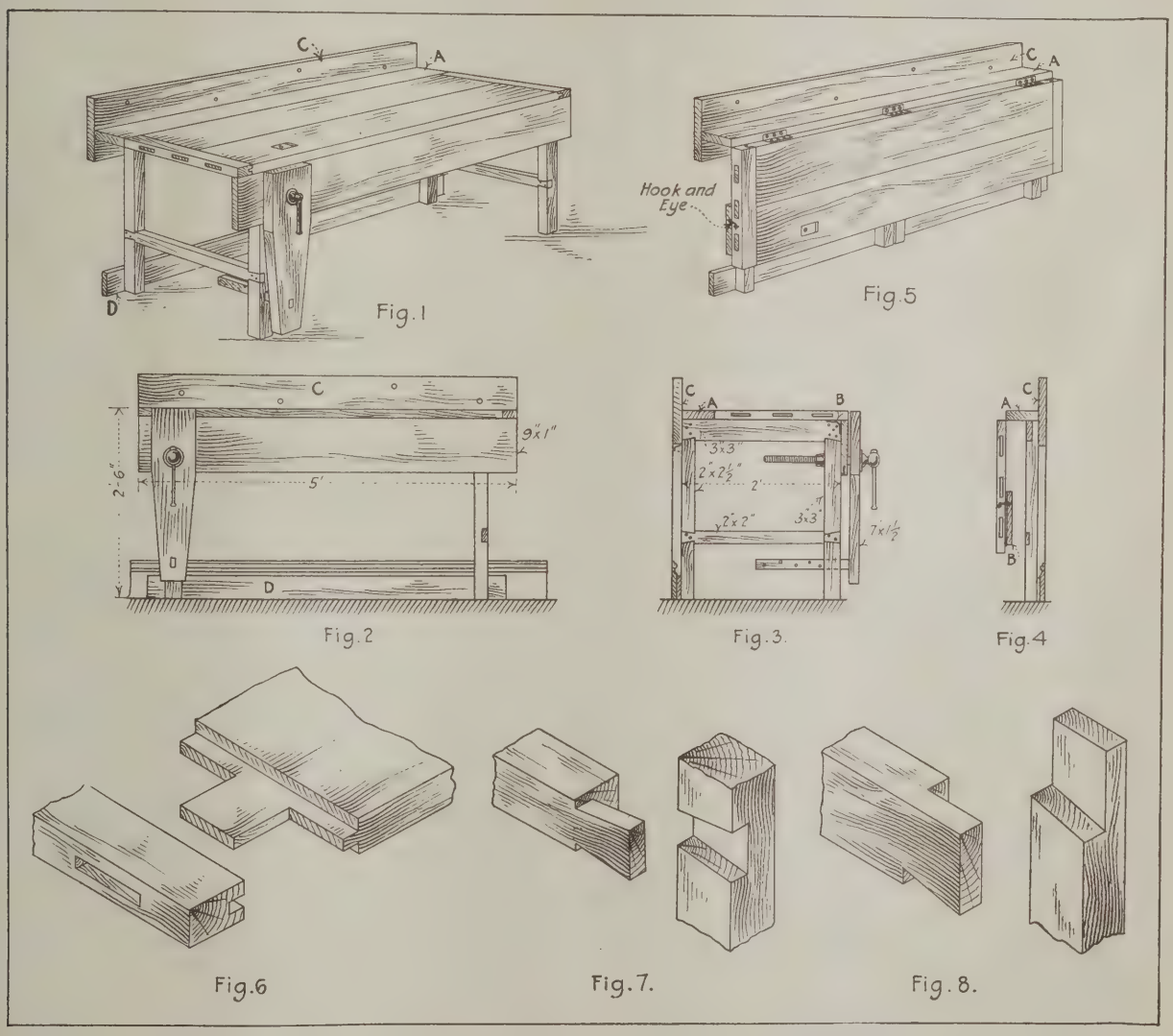
A Form of Bench Described by an English Writer Possessing Many Features of Convenience

IN view of the comments which have recently been appearing in these columns regarding carpenters' workbenches and their method of construction, the accompanying illustrations of what may be termed a collapsible bench contributed by a correspondent to one of our London contemporaries, may contain suggestions for American mechanics. The bench is of a character to meet many requirements where a portable affair is used only occasionally. When the bench is not in use it may be dismantled, so to speak, and made to occupy small space against the wall. A general view of the bench is shown in Fig. 1, a front elevation in Fig. 2, a side elevation in Fig. 3, and the end appearance of the bench when folded against the wall and not in use in Fig. 4. In Fig. 5 is another view of the bench when folded against the wall.

According to the London *Building World* correspondent, the top should be at least 1½ in. thick, formed of two boards jointed together. In order to keep it true it should be clamped and tenoned, as shown in the enlarged detail, Fig. 6. The top should be hinged to the rail *A*, and the side of the bench hinged to the top, as shown at *B* in Figs. 3 and 4. For this purpose 3-in. butt hinges are used.

The wall piece, *C*, shown in the various sketches, should first be firmly screwed to the rail of the top, *A*. The legs should be hinged at the top to this piece and also at the bottom to the strip, *D*, Figs. 1 and 2, each strip to be sufficiently thick to project from the wall the thickness of the wall piece, *C*. The latter can be attached to the skirting board with a few screws.

The wall piece, *C*, if against a lath and plaster



Various Details of a Collapsible Workbench for Building Mechanics

partition, can be firmly and easily fixed to two or three of the studs of the partition with a half dozen screws. On the other hand, if it is against a brick wall, a few holes should be drilled into the wall and hardwood blocks driven in, or, better still, probe the wall with a long fine bradawl until the joints are found and then with a steel chisel cut a hole about ¾ in. square and 3 or 4 in. deep. These holes may then be fitted with hardwood blocks, into which screws are inserted through the wall piece.

The leg to which the screw is attached is of a larger size than the others. The side and top of the bench when folded can be kept in position by means of a hook and eye, as shown.

A simple method of jointing the legs and rails is that of lap dovetailing, the details being shown in Figs. 7 and 8. One of the improved iron stops which requires letting in will be found a convenient form of bench stop. The bench here shown may be made additionally firm by inserting a few screws through the side into the legs and through the top into the rails. When it is desired to remove the bench all that is necessary is to withdraw these screws.

Garage on Old Landmark Site

After having remained vacant for many years a site on Broadway, just below Astor Place and running through to Lafayette Street, which in a way is notable for the variety and fate of the buildings which from time to time have occupied it, is about to be improved by a seven-story garage and service structure, estimated to involve an expenditure of something like $700,000. The plot has a frontage on Broadway of about 121 ft. and on Lafayette Street it will have a frontage of 135.9 ft. According to the plans which have been prepared by William Steele & Sons of Philadelphia, Pa., the building will be of reinforced concerete construction with ample illumination on both streets. Each of the seven floors will contain 30,000 sq. ft. of floor area and every floor will be divided with fire walls built across the center of the structure.

An interesting feature will be the use of the roof as a recreation space for employees. The first four floors on the Broadway end of the building will be used for automobile garage, storage and repairs, while the fifth, sixth and seventh floors will be given over to storage purposes.

On the Lafayette Street frontage the first floor will be used as the main shipping department, and here driveways affording easy access to the cars will be provided. Above the main floor the space will be used for storage and manufacturing.

The building will have three freight elevators, one combination passenger and freight elevator, and three elevators for automobiles. All passenger elevators will extend to the roof of the building.

In addition to the elevator system, the building will be equipped with four smoke-proof, fire-tower stairways which will extend from the first floor to the roof level. For the exclusive use of the employees of the garage one extra smoke-proof, fire-tower stairway will be installed from the first to the fourth floor.

As intimated above several landmarks occupied this site during the past half century. In the late seventies a portion of it was occupied by a church, which was later destroyed by fire. After remaining vacant for a time the then well-known theatrical firm of Harrigan & Hart erected on the site an attractive theater, wherein these well-known personages amused the public for several years when the building was destroyed by fire. Again the site remained vacant for a time when it was improved by the erection of what was known as Ye Old London Street, which looked something like the Tower of London from the outside, and inside was intended to typify some of the old-time streets in London, with the quaint stalls and which partook more or less of an exhibition place. This not proving a success, the old Broadway Athletic Club had its headquarters there for a time, since when the site has remained vacant, the present purchaser having acquired the property some twelve years ago.

Paneling in Olden Times

In the olden days a house was not thought complete or up to date without a quantity of oak or other hardwood paneling. This paneling was usually of rather intricate design and was all mortised together to make a good, sound, well-fitting job and something that would last as long as the building itself. In this generation of "spike tenon" building, however, the demand is not for durability as much as it is for appearance and price, most generally the latter, and for that reason the panel work of today, while an artistic and pleasing effect, is often liable to open up at the joints before the first winter is gone, says George M. Peterson, in the *Pittsburgh Gazette Times.*

Although the present-day paneling probably costs about as much as did the real high-class work of other years, the cost is due, not to any better materials or any better workmanship, but rather to the high cost of poorer materials and ordinary labor.

Also there are very few of the present-day carpenters who can turn out a really first-class paneling job, due to the fact that perhaps 90 per cent of the paneling used is turned out in a mill and merely assembled on the job.

Of course, there are a number of cabinet makers who can do as good, or perhaps better, work than the old-timers, but by the time they get the wages that are demanded today and work at the same speed as their brothers did thirty or forty years ago for less than half the wages, the cost of paneling is brought to such a high price that it is almost out of the question for the medium-priced home.

Public opinion also has changed in regard to panel work, so that it is very seldom that one sees any panel work in the modern dwelling, except in the living rooms, dining rooms, reception halls and perhaps on a stairway, and only the dining room wainscot is paneled in the great majority of houses.

At the annual meeting of the National Fire-Protection Association held in Chicago on May 9, one of the important topics for discussion was that of safeguarding school children from fire. The topic is subdivided into Planning School Buildings for Safety, Exit Drills and Fire Escapes and Care of School Buildings.

A Church Edifice of Unusual Design

The Building Is So Arranged That at Some Future Time It May Be Used as a Church Club-house

By Charles Alma Byers

THE church edifice here shown, although most attractive from every point of view, is of truly unique design, both inside and out. Outwardly it might be readily mistaken for a club-house, and on the inside is found not only the customary pulpit but also a roomy stage, equipped with drop curtain and footlights. Although expected to serve as a real church structure for several years to come, it is designed to some day become a church club-house, when a more pretentious church building can be erected on the ground adjoining, in front. Hence, its uniqueness is not without reason.

The outside dimensions of the building are 79 by 99 ft. Its foundation, of which considerable is exposed, is of solid concrete, but the chimneys, as well as the walls of the window bay on the front, are of cement-stucco-over-brick construction. The framing timbers are of Oregon fir, and the outside walls are covered with split cedar shakes, stained a dark brown. The roof is shingled, and is painted a very light green.

The structure occupies a large corner lot, and the three corners exposed to the front and side streets are designed, with circular walls, as sort of low tower extensions. These are covered with partially individual roofs, of the comparatively flat and circular type, which break forth from the slopes of the main roof. The building possesses no spire or steeple, and has a general appearance of being low and rambling. The outside finishing timbers are unsurfaced, to match the split shakes, and, aided by the contrast of colors, a rather rustic effect is made to dominate the whole exterior.

There are two entrances—one on the front and one on the side facing the side street. The former is by way of a porch which is floored with concrete and is principally uncovered save by pergola beams, and which is reached by a short flight of concrete steps at one end. The other entrance is also provided with a porch, but the porch in this case has board flooring and steps and is covered with a shingled roof, as well as being inclosed at the ends.



Photographic View of the Wilshire Christian Church at Los Angeles—Architect W. C. Harris of That City

The interior arrangement—that is, of the main floor—will be seen from an inspection of the plan. The auditorium, 59 by 64 ft. in size, has, together with the balcony, a seating capacity of 600. The pulpit is located at the end opposite the front entrance, and adjoining it on the right are the baptistry and the choir loft. The stage, previously mentioned, is 17 ft. 6 in. by 31 ft. in size, and is located so as to face the side entrance. It, like

the choir space, is elevated 33 in. above the main floor. The footlights, with which this stage is equipped, are arranged in the usual fashion, but a strip of flooring has been prepared for use as a lid-like covering for the light gutter, when the stage, as such, is not required. Both rod and drop curtains are provided, and by these the space may be entirely concealed, or the stage can be utilized as a Sunday School class-room.

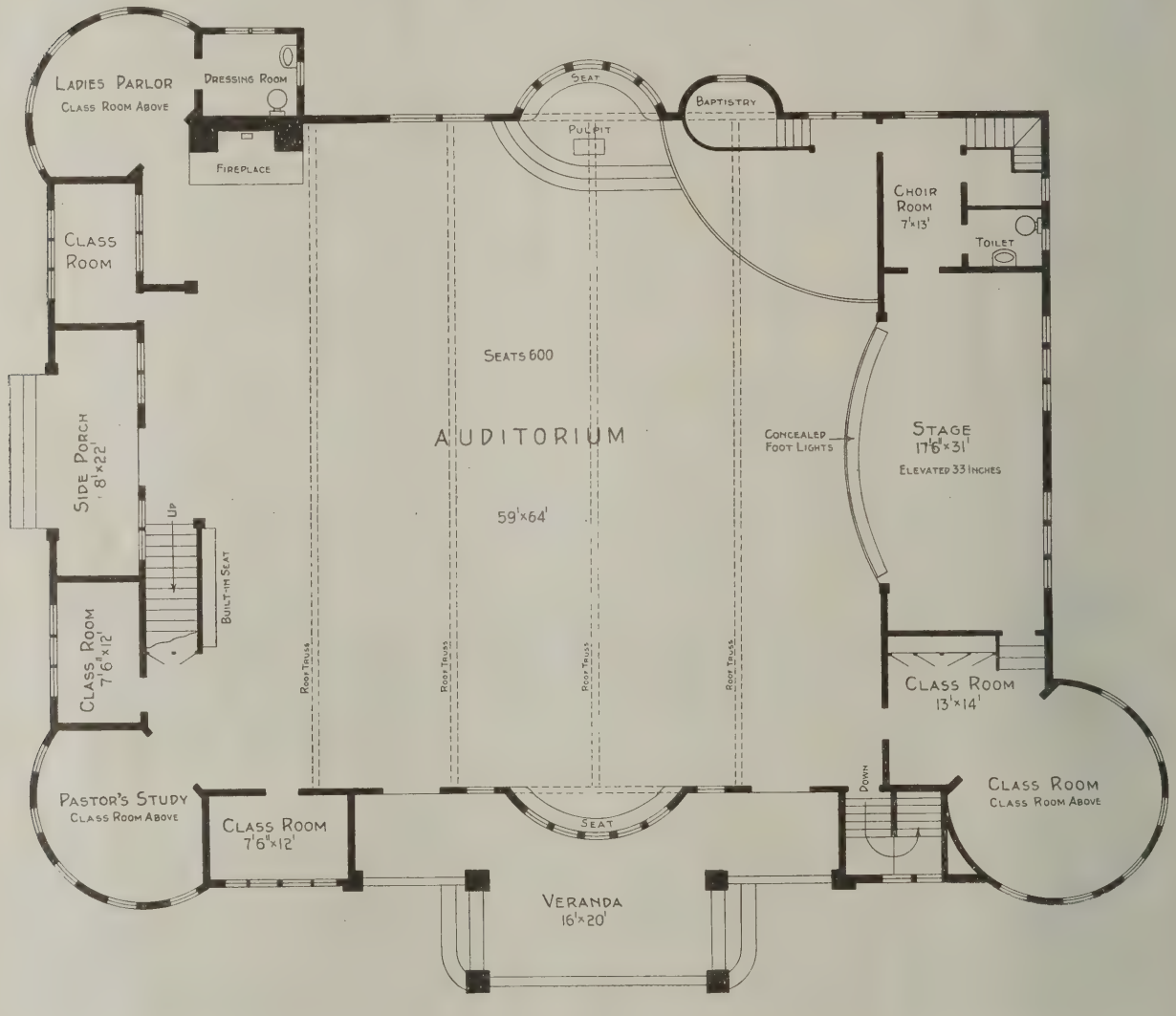
The seats of the auditorium are movable, and hence may be placed to face either the pulpit or the stage. The balcony seats face the latter, and yet they command a very satisfactory view of the pulpit. The floors throughout are of pine.

The circular corner extensions are two stories in height, exclusive of the basement, and in and adjoining them, on the two floors, are the several Sunday School class-rooms, the pastor's study, a ladies' parlor and dressing room, and so forth. A small choir room, a second lavatory and one of the two stairways leading to the basement occupy the other corner, which is one story in height.

In one end of the space beneath the balcony is located a massive pressed-brick fireplace, with a hammered-brass hood. Before it is frequently held the prayer-meeting service. The auditorium is unceiled, an interesting arrangement of beams and trusses being exposed overhead. The interior woodwork is of Oregon fir, stained a light brown, and the plastered walls are tinted a light buff shade. The windows which admit light to the auditorium are of art glass, but those of the class and other small rooms are of ordinary glass. A built-in seat occupies the curve of the bay on the front, and a similar seat, with a hinged top, is located along the stairway leading to the balcony.

Although including a well-equipped stage and otherwise designed to be eventually converted into a church club-house, with but few changes, the interior of the structure has a true churchy appearance, and as a church edifice is well arranged.

Underneath the structure is a basement which covers the entire building space. It is walled and floored with concrete, and is utilized principally as a large banquet room, with a fair-sized kitchen, fully equipped, in one end. The portion devoted to the banquet room, however, may be divided into smaller rooms by the use of movable partitions, designed after the style of large folding screens, which are provided.



Floor Plan of Church Edifice of Unusual Design—Scale 1/16 *In. to the Foot*

Known as the Wilshire Christian Church, the building is located in Los Angeles, Cal., and was designed and built by Will C. Harris, architect, of that city. The cost, including seats, furnace, etc., was approximately $18,000.



Suburban Cottage of Moderate Cost

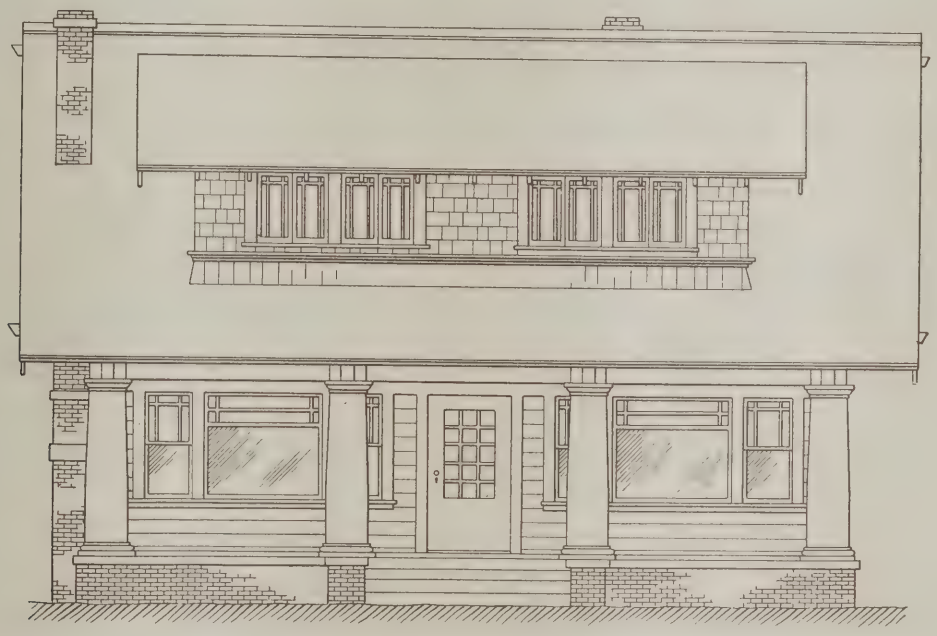
Design Forms Basis of Colored Supplemental Plate—Details of Construction of Interest to the Builder

WE have taken as the basis of our supplemental plate this month a story and a half frame cottage of a design well suited for execution in any section of the country. It is of moderate cost construction and noticeable features are the veranda extending entirely across the front of the building and the dormer windows which break up the long sweep of the roof. The main body of the house is covered with ¾ x 4-in. and ¾ x 8-in. resawed siding laid in alternating courses over 2-ply building paper. The second story walls and gable ends are covered with 1 x 6-in. shiplap laid horizontally, over which are nailed 1 x 2-in. furring strips placed 8 inches apart. These are covered with 6-in. shakes placed 1 in. apart and exposed 8 inches to the weather.

The rafters are covered with 1 x 6-in sheathing boards, over which is a layer of two-ply building paper, and on this in turn are laid Star A shingles exposed 4½ inches to the weather. The same kind of paper is placed over the sheathing boards on the outside walls.

Reference to the accompanying floor plans shows the living room to extend entirely across the front half of the cottage and having at the extreme left an open fireplace served by the outside chimney shown on the supplemental plate. The hearth is supported by a trimmer arch of concrete 20 in. wide, extending the full length of the chimney breast. The fireplace is to be lined with firebrick laid up in fire clay and the face is to be laid up with pressed brick in colored mortar. Beyond the living room at the left is the dining-room with a built-in buffet and china closets, while at the right is the kitchen communicating with the dining-room through a well-equipped pantry and also with the living room through a passage from which rise the stairs to the second floor. In the pantry the sink is placed directly under a window, thus giving ample light. Immediately at the left of the sink is a cooling closet with removable wire screen shelves and having screen vent at top and bottom to run to the outside of the building. The stairs to the cellar lead directly from the pantry, being convenient to the kitchen.

On the second floor are three sleeping rooms and bathroom, together with ample closets for clothing. It will be noted that the stairs are well lighted by a double window at the broad landing clearly shown on the plan.



A Suburban Cottage of Moderate Cost—Front Elevation—Scale ⅛ In. to the Foot

According to the specifications, all foundation walls, footings and piers are to be of concrete mixed in the proportion of one part Portland cement, three parts sand and four parts broken stone of such size as to readily pass through a 2-in. ring. A 3-in. tile drain is to be laid around the foundation wall and connected with the sewer.

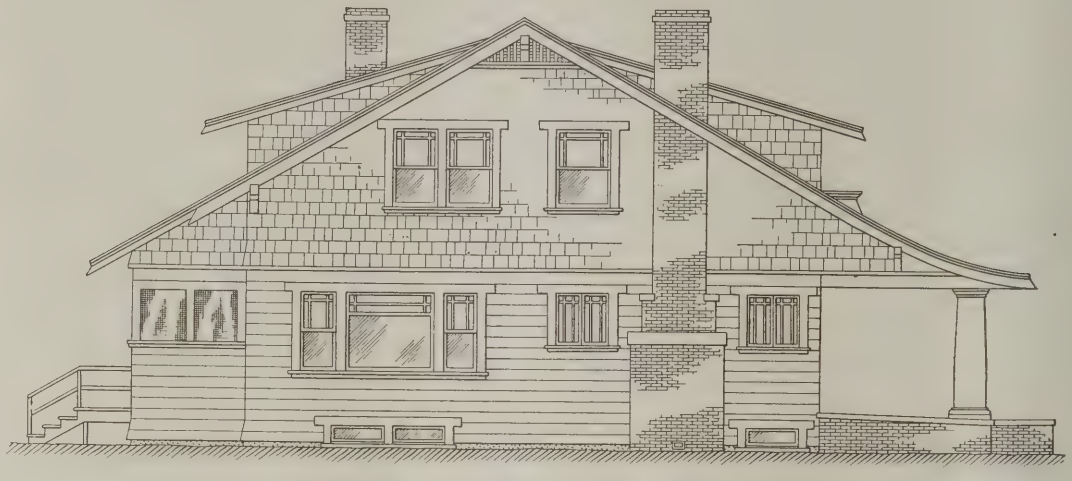
The walls of the chimneys are to be 4 in. thick, and the flues are to be 7½ x 7½ in. in the clear for one outlet and 7½ x 11½ in. in the clear for two outlets; all flues to be plastered inside and laid in cement mortar from the top to the ceiling joists below. The outside chimney for the living room is secured to the framework of the building with iron anchors placed every 3 ft. The exposed portions of

the chimney are to be constructed of ruffled brick.

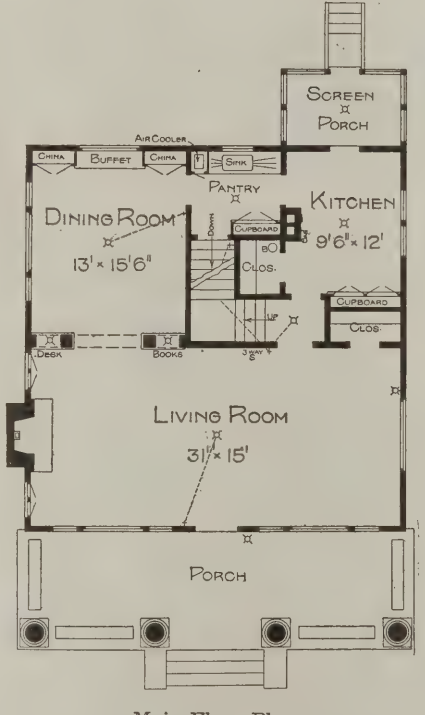
The porch columns are to be staved up 2 in. thick and made of poplar or white pine planks, according to preference of the owner. The ceiling of the porch is to be covered with 1 x 6-in. tongued and grooved V pine ceiling. The front porch floor is to be made by filling in the area with earth thoroughly soaked with water and tamped, and on this a concrete grouting 3½ in. thick is to be placed. The grouting

6 ft. 8 in. high with hardwall plaster, and all corners are to be protected with metal corner beads.

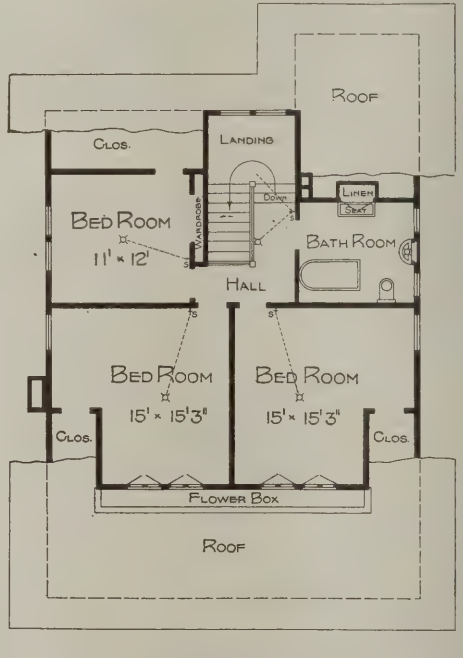
The framing timbers include mud sills 2 x 6 in., first floor joists 2 x 8 in., second floor joists 2 x 10 in. and ceiling joists 2 x 4 in., all placed 16 in. on centers. The studs are to be 2 x 4 in., also placed 16 in. on centers, and the rafters are to be 2 x 4 in., placed 32 in. on centers. The floor joists running lengthwise under partitions are to be double. All



Left Side Elevation—Scale 3/32 In. to the Foot



Main Floor Plan



Second Floor Plan

Scale 1/16 In. to the Foot

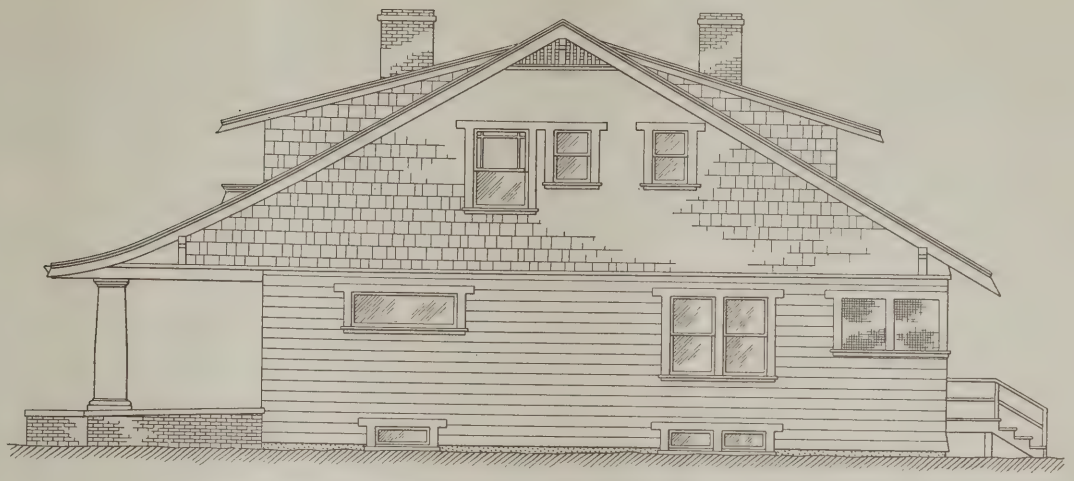
A Suburban Cottage of Moderate Cost—Plans and Elevation

is to be covered with a finish coat of cement ½ in. thick mixed in the proportion of one part Portland cement to one and a half parts coarse, sharp sand, and to be marked off to represent tile.

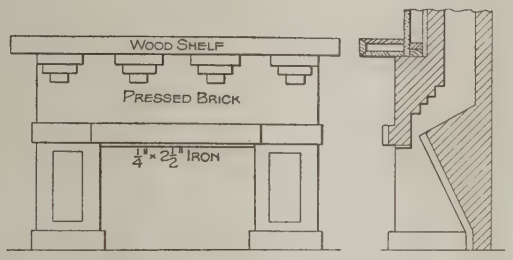
The cellar of the house is to have a concrete grouting floor of the same general construction, the floor to be graded to a bell trap. The plastering of the rooms is to be two-coat work with sand finish. The kitchen and bathroom are to be wainscoated

stud walls and partitions are to be bridged with 2-in. material. All corners are to have diagonal braces, and all openings of 5 ft. or over are to be thoroughly trussed.

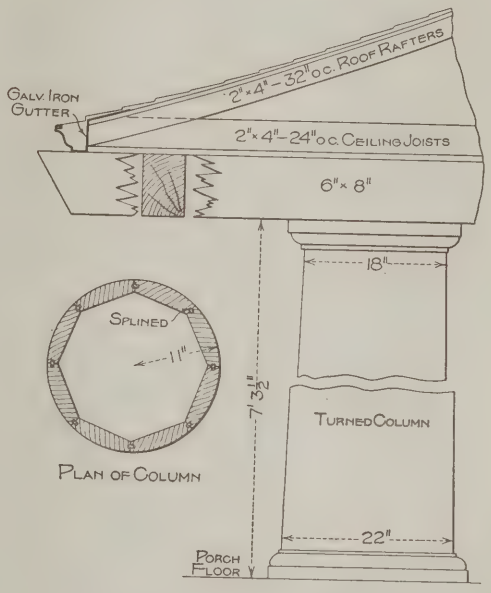
The floors are to be double, the sub-floor consisting of 1 x 6-in. pine, over which is to be placed a layer of two-ply building paper, and on this the finish floors are to be laid. In the living and dining rooms the finish floors are to be ⅞-in. tongued and



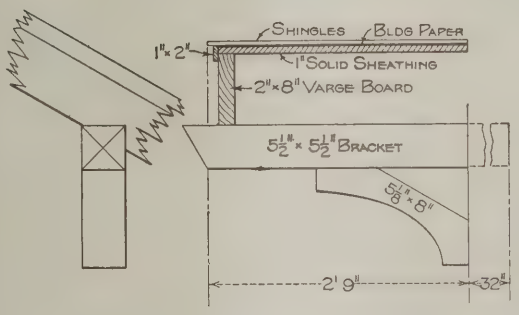
Right Side Elevation of the Building—Scale 3/32 In. to the Foot



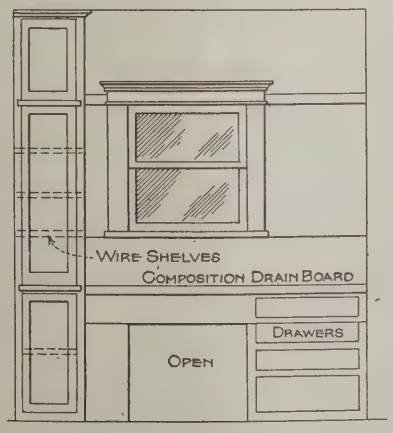
Elevation and Section of the Fire Place—Scale ¼ In. to the Foot



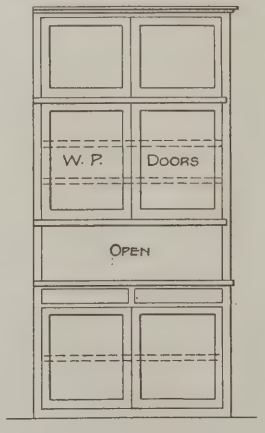
Section Through Porch Showing Details of the Column and Cornice—Scale ½ In. to the Foot



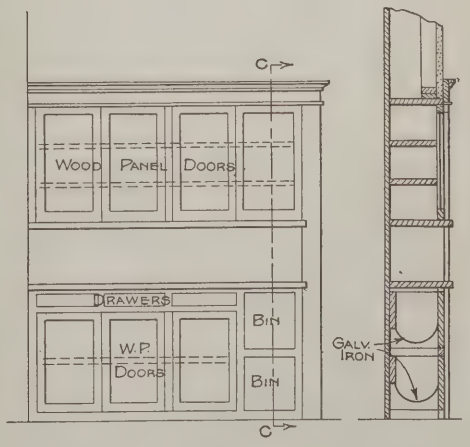
Front and Side Views of the Barge Board—Scale ½ In. to the Foot



Cooler and Sink in Pantry



Elevation of Cupboard in Pantry



Elevation and Section of Cupboard in Kitchen

A Suburban Cottage of Moderate Cost—Miscellaneous Constructive Details

grooved quarter-sawed oak, blind-nailed every 8 in. They are to receive two coats of wax well rubbed between coats. The floors in the other rooms are to be 1 x 4-in. tongued and grooved pine.

All woodwork in the living and dining rooms is to receive one coat of stain, one coat of filler and two coats of Berry Bros. flat varnish. The woodwork in the bedrooms, bathroom, back hall and kitchen is to receive three coats of flat white and one coat of white enamel.

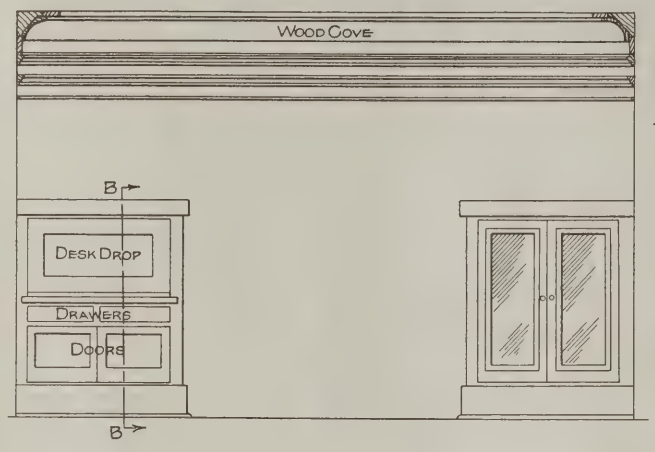
All sand-finish plastered surfaces are to be sized and receive one coat of tint color.

The doors, except the front entrance door, are to inch shelves and 1⅛-in. door glazed with bevel-plate mirror.

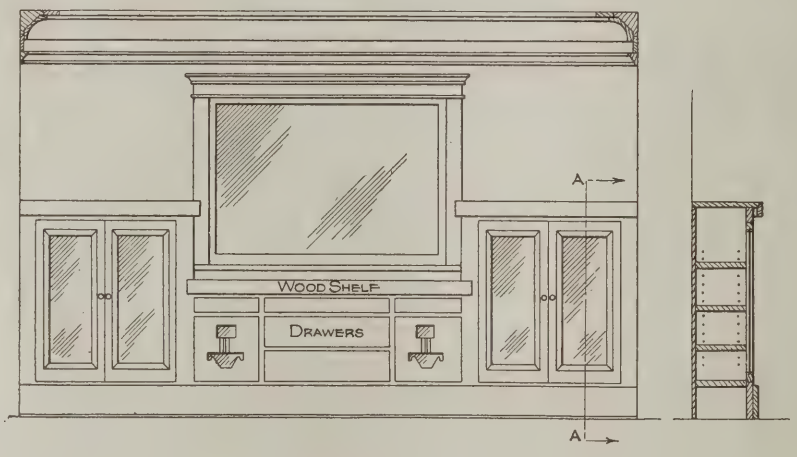
The sink in the pantry is to be 18x30 in., of white enamel and with nickel-plated fittings. The laundry is to have a two-part porcelain enamel tray with hot and cold water connections. A gas water heater and boiler set on a bracket, and to have a pilot light, is to be provided.

The house is to be piped for gas and wired for electricity, the wire system to conform to the rules and regulations of the National Board of Fire Underwriters.

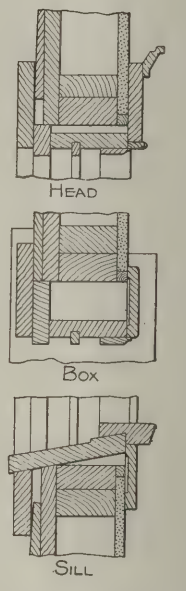
The exterior siding of the house is to receive two



Buttress Opening Between Living and Dining Rooms, Showing Desk at the Left and Book Case at the Right



Elevation of Buffet in End of Dining Room with Section on Line A-A
Scale ¼ In. to the Foot



Details of Window Frame Showing Sill, Box and Head—Scale ½ In. to the Foot

A Suburban Cottage of Moderate Cost—Miscellaneous Constructive Details

be 1⅜ in. thick and of the five-panel Colonial type. The front door is to be 1¾ in. thick, of veneered oak on the outside and slash grain pine on the inside. It is to be glazed with double plate glass.

All sash is to be 1⅜ in. thick, and double-hung windows are to be fitted with Sampson or Silver Lake sash cord and balanced with iron weights. All casement windows are to be hung on Parliament hinges.

The plumbing fixtures are to be of the modern type. The bathroom is to be equipped with one 5-ft. porcelain enamel tub with 3-in. roll rim, a porcelain enamel lavatory, a closet with low-down china tank, wash-down bowl and nickel-plated piping. There is also to be a medicine cabinet fitted with half-

coats of silver-gray mixed paint and the shingles of the roof are to be stained green in color.

Blueprints covering plans, elevations and various details of construction all to convenient scale for the builder, together with typewritten specifications, can be obtained by any interested reader for $10. In ordering designate design No. 660.

According to the Bulletin of the Industrial Commission of the New York State Department of Labor the percentage of unemployed was smaller in March this year than was the case in the corresponding month a year ago and compares favorably with each of the four years preceding except 1913.

Cabinet Work for the Carpenter

Details of Construction Relating to What Is Known as a "High-Boy" and a "Low-Boy"

By Paul D. Otter

THE full meaning of the description contained in the dictionary definition as below is no doubt mixed up with a certain amount of social and political significance during the seventeenth and eighteenth centuries, evidently with some humor in designating the family linen stand as a "high-boy" or a "low-boy," with somewhat the same distinction as existed between the high churchman of the Tory and the low churchman of the Whig party.

As we delve into the history of family furniture we find that the "low-boy" sprang from the lowly box with hinges and a padlock, then to the hutch, chest, or coffer with some pretensions to form and ornament; later to its elevation on low leg-like supports, and finally to its graceful development during the middle of the XVIII century, and its natural enlargement to the "high-boy" proportions of the well-ordered mansion.

"High-boy—A tall chest of drawers supported on legs from 18 in. to 2 ft. high. Those on shorter legs are called low-boys."—*Century Dictionary.*

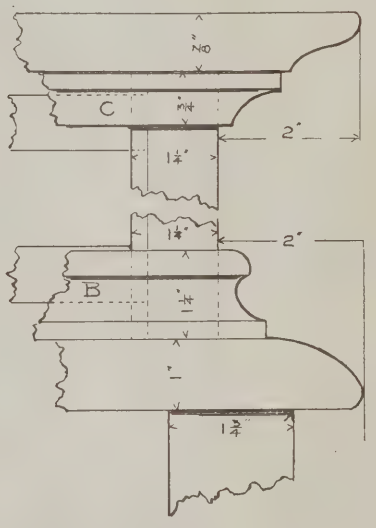
Fig. 1 represents the general proportions of the "high-boy" in a simplified form, a composite in which the Jacobean is more evident in the knurled turnings of the lower structure, or stand. This pattern of turning Fig. 5, can be produced on any lathe. Should the enthusiast aspire to a more typical rendering of the Jacobean turning, he can leave the knurled portion turned blank and proceed to carve with grooving chisel and flat oval, the spiral, or single twist, finishing up with wood rasp and sandpaper. The method of marking out the spiral for cutting is by tacking a piece of twine, or tape, at the beginning of the turned blank and twisting it in a natural spiral to the other end and tracing its course with a pencil.

So much for the Jacobean. To give a rendering of "William and Mary" style, a stand or base may be substituted with that form of leg, shown in Fig. 8, the detail of which is fully indicated. The upper carcase containing the drawers and consisting of top and base of which Figs. 3 and 4 are details, would be quite proper for either a simple



Fig. 1—Front Elevation Fig. 2—End Elevation

Scale 1/16 In. to the Foot



Figs. 3 and 4—Details of Top Cornice and Base Mold of "High-Boy" —Scale ⅜ Full Size

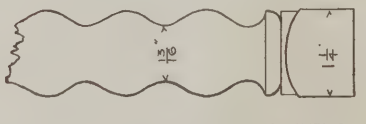


Fig. 5—Strainer Rail of "High-Boy"—Scale ⅜ Full Size

Cabinet Work for the Carpenter—Details of a "High-Boy"

Jacobean or "William and Mary" treatment. The top and base consist of a solid ⅞ x 1 in. panel molded as shown, with the stuck molding mitered around as an after finish.

With the aid of the half plan of construction frame shown in Fig. 7 the building of the cabinet will be found quite easy. There are seven of these frames, the fronts of which, exposed as they are between drawers, should, of course, be of the same wood as the drawer fronts and outer sides. The sides and back part of the frames can be of any ordinary wood. Five of these frames separate the drawers; the first and seventh frames are at the top and bottom of the carcase proper, and all are secured to the solid side panel in the manner shown in Figs. 6 and 7.

The inner front edge of the side panels is reinforced in thickness by a carefully glued strip ¼ x 2¼ in., faced off flush on the front edge. A cleat strip ¼ x 1 in. is then glued across the inside width of the panel, upon which rests each frame in its proper spacing.

When the seven frames Fig. 7, are finished to a careful fit, allowing for cut-out ends on front rail, in. rails set in posts on the front line of turned rails, which occupy the middle position on the 1¾ in. posts. The outcurve of the front posts is secured by glueing on front and side faces an extra thickness of 1 in. Added strength to the stand, as well as to the case, should be given by placing glue blocks and three-cornered soft wood glue strips wherever they do not interfere. Through the large corner blocks of the stand heavy screws may be set into the bottom of the upper case.

Definite size for the drawers is a matter of fact now, and their construction is in order, allowing fair play top and bottom in the final fitting. This

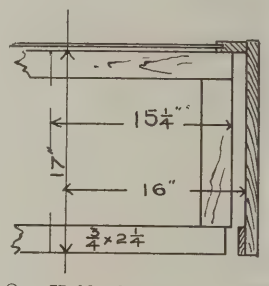


Fig. 7—One-Half of Case and Construction Frame

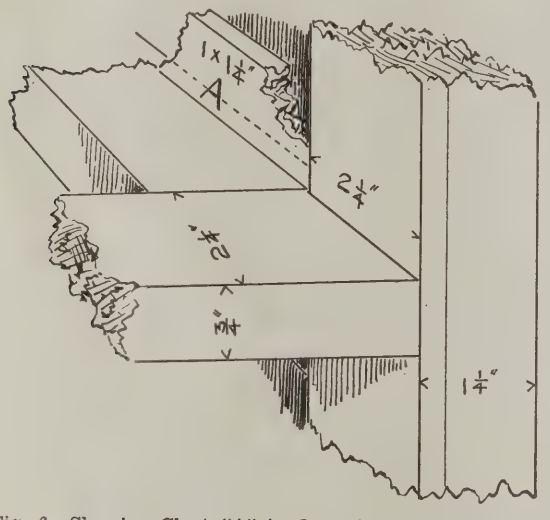


Fig. 6—Showing Cleat "A" in Over Construction Frame

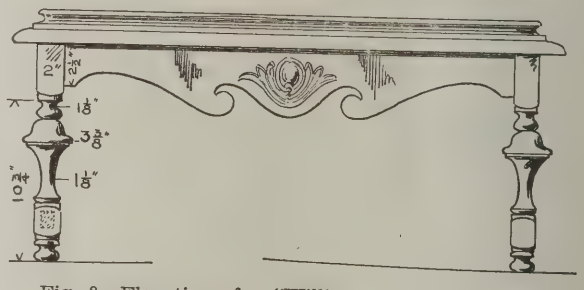


Fig. 8—Elevation of a "William and Mary" Base

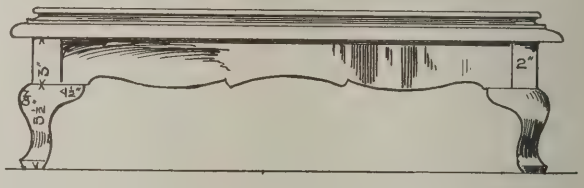


Fig. 9—Elevation of a "Queen Anne" Base

Cabinet Work for the Carpenter—Details of a "High-Boy" and a "Low-Boy"

as shown, the case will be ready to set up. Here some assistance may be found necessary to get the work along quickly with so many frames set in fresh glue, although the top and bottom frames could be glued up and held in bar clamps without much trouble, care being observed to have the structure squared before going ahead. Each frame could then be slid separately in its glue, along the cleat from the back side. Cabinet nails should be driven in a slanting manner through the cleat and partly into the sides.

A similar filling, in cleat *A*, Fig. 6, is then set in glue on top of the frames. This cleat should be of some hard wood as maple, for it does service as a guide and slide for the drawers to run smoothly, and should finally be rubbed with paraffin. The back filling consists of a 13/16 x 2½ in. frame with one or two middle bars and filled in with 3-ply veneer panels or 3/16 in. compo-board. These should be set in grooves before glueing up the frame. There is a great advantage in having the frame fitted in a fairly tight manner.

The stand *D*, clearly shown, consists of four 2½ is best secured by having drawer fronts, which are ⅞ in. thick, made to fit snugly, but with the side panels dovetailed in a setback, or rabbett, 1/16 in., as this allows for weather conditions. The back corners are also dovetailed without any end projection. The sides and back are 7/16 in. poplar, or white wood. The bottoms can be of 3-ply veneers inserted in grooves ⅜ in. from the bottom edge when setting up. The drawer knobs for the two smaller top drawers are 1¼ in. diameter, plain turned and set out ¾ in. The knobs for the lower drawers are 1½ in. and are set out ⅞ in.

Glued stop blocks should be set in on frames in back so that all drawers stop slightly back of the case frame and the drawer divisions.

The low-boy is a matter of diminishing height of the upper structure by leaving out the two lower drawers, or substituting one 9 in. drawer for the 7½ in. drawer. To make a typical low-boy suggestive of "Queen Anne" style, the low base Fig. 9 is shown with the few measurements given to assist in shaping the front legs, the back legs being 2 in. square, tapering to 1½ in. at bottom.

Construction of Old English Roofs

Massive Nature of Old Roofs—Various Styles—Moldings—Open Timber Ceilings

THE extracts which follow are taken from a lecture by Arthur Keen, a Fellow of the Royal Institute of British Architects, delivered at Carpenters' Hall, London, under the auspices of the Worshipful Company of Carpenters.

The roof has been the governing factor in the arrangement and contrivance of our buildings, and just as in the East the buildings are contrived to support and buttress the dome and its surrounding vaults, so in the North it is the roof that limits our architecture, and disposes our churches in long narrow naves and aisles and transepts that can be covered by a construction formed by timber, which is only found in limited lengths. In fact, it is the most important consideration in a plan. The old farms and cottages, the great manor houses that are among the most precious possessions of this land owe half their beauty to their simple straightforward roofing. The long main lines and dignified gables, and the great chimneys upstanding at regular intervals group themselves into beautiful arrangements, and offer a sky line that is unrivaled in any other kind of buildings.

The Roof as Carpentry

Now the simplest possible form of roof is the lean-to, just a sloping beam laid from a high wall to a low one, and it might almost be dismissed from consideration, only it is a roof that is universally used, and often receives very skillful design and workmanship.

Used in churches, it enables the interior to be really well lighted by means of clerestory windows. What is done in most churches to secure good light is to raise walls on the arches, between the nave and aisles, with windows in them, and to roof the aisles with lean-to roofs at a lower level. These lean-to roofs are generally very flat, so that the wall containing the windows may not be too high. A wall on arches is not a very staple thing, and the lower it is the better for its strength and security, and, of course, the cheaper. At the same time, if the aisle roof is a flat one the side walls can be of a good height, and thereby the dignity of the church is much enhanced, and the aisle windows made larger than they would be in a low wall. Sometimes these roofs are of lean-to form, and sometimes they are flat roofs sloping both ways.

Massive Construction of Old Roofs

Most of the old roofs are of very massive construction; often there may be quite twice as much material in them as a scientific carpenter might think necessary. So obviously is this the case that in most instances the old carpenters laid their rafters flat instead of on edge after the modern fashion. They realized that in the course of the centuries of a building's life all kinds of things may happen. Alterations may have to be made, water may get in and rot off half the substance of a beam, a fire may occur, thatch may be replaced by tiles or lead. If there is plenty of material, the decayed wood can be cut out, and a perfectly sound repair can easily be made, and in any case a building with a large reserve of strength will suffer neglect for a long period without collapsing. In old work it is with the roofs as it is with the walls, which are so thick that they will remain standing long after reaching the point at which a thin modern wall built of better material would fall.

One of the best looking roofs I ever saw was at North Walsham in Norfolk, and there was not a molding on it, but the timbers in it were enormous. It is a very interesting example, because it is so contrived that arcades, which run from end to end of the church without any cross walls are buttressed, and stayed securely by the nave and aisle roofs being connected. The tie beams run right through the stonework of the arcading, and are framed to upright wall posts on both sides, so that the walls are held as in a vise, and they have as a matter of fact remained quite upright for nearly 600 years.

Moldings on Old Roofs

Incidentally, I may point out that the molded work of the old roofs is always wrought out of the solid wood. Carved and pierced crestings are cut in separate pieces and fixed on, always in an honest an obvious way, but the moldings are worked on the solid. They are ornamented construction, not constructed ornament.

The old carpenters loved the sweet simplicity of stiff cross beams of enormous size upholding the roof, and preventing any outward pressure. Lead being a favorite covering material, it follows that many roofs are practically flat, and framed like a timber floor with big cross beams, smaller longitudinal ones called purlins, and still smaller filling timbers called rafters. They have, of course, a slight slope to the two sides; they are richly molded, paneled, ribbed and carved, and often have elaborately-carved brackets to support the main beams.

Constructional Problems

The constructional problems connected with roofs are mainly two in number—to prevent outward thrust, and to prevent the rafters from bending; and it is in dealing with these two problems that most of the scope for decorative treatment is found. Some of these nearly flat roofs have the cross beams cut out of bent trees, so as to follow the slope of the roof, but it is more usual to cut the beam deeper in the center than at the ends.

In most old roofs there was a good deal of reliance placed on the resistance offered by the thick heavy walls, but at the same time every effort was made to reduce the outward pressure on them caused by the sloping roof timbers.

A Trussed Rafter Roof

The old builders put a short timber across the wall which was 2 ft. or more thick, framed the foot of the rafter to the outer end of it, and then from the inner end of it they put a short upright piece also framed to the rafter. At the same time they put cross pieces higher up from rafter to rafter, and other pieces across the angles, all pegged together, and this gave them what we call a trussed rafter roof—that is to say, a roof in which each pair of rafters is trussed or framed together so as to be self-supporting. It is a type of roof that was used continually in the Mid-Gothic period—in the fourteenth century and onward, and with endless variation in the arrangement and proportions of its parts. Generally the pitch of the roof is a steep one, so as to reduce as much as possible the thrust on the walls. In the West country the inner struts and cross pieces were often curved and made continuous, so as to give the roof the appearance of a vault. In many cases, and again especially in the West, the underside of these roofs, whether arched or angular, was boarded to form a ceiling divided into panels by molded ribs with carved bosses at the corners. This was done especially at the east end of the church, and very often the panels received most beautiful color decoration in emblems, monograms, and leaf or diaper work.

What we may call an open timber ceiling in a mediæval building, and an example that is interesting to Londoners, is that at Crosby Hall, pulled down in 1908 and re-erected at Chelsea. There were great crossed scissor beams to tie in the roof, and this ceiling was a practically independent construction below them. One imagines the ornamental pendants as being the lower ends of constructional posts, which, however, is not the case.

(*To be continued*)

Model Showing Portland Cement Manufacture

A model which is a miniature of a real cement plant and covers 80 sq. ft. has just been completed in connection with the educational exhibition work of the Division of Mineral Technology of the National Museum at Washington, D. C. The design and layout of the plant are such as to enable the visitor to follow successively the various steps of the process of cement manufacture by walking around the model. Those who have viewed it state that a person can learn more in a half hour by viewing it than spending a whole day in an actual plant.

Portland cement may be defined as a product made by burning limestone and clay, which has been mixed so as to form a certain composition, and grinding the resulting "clinker" to powder. In the early days much mystery surrounded the manufacture of Portland cement when it was first discovered by a bricklayer of Leeds, England. He found by mixing water with a compound of Tnames chalk and Medway mud he could compound an artificial water cement, and determined that no one should discover his secret. When manufacturing his raw mixture he is said to have attired himself in a long black gown and the pointed hat of the mystic and to have recited mysterious incantations during his operations.

In this country the Portland cement industry had its beginnings in the Lehigh valley in Pennsylvania, chiefly in Lehigh and Northampton Counties, where John W. Eckert, a chemist, discovered that there occurred a limestone composed of approximately the correct ingredients necessary for the manufacture of Portland cement. The model represents the process of manufacture used in this section of Pennsylvania, where the limestone that is used is termed cement rock.

At one corner of the model a cement rock quarry with drills at work and steam shovels loading cars are shown. Extending along the side adjoining the quarry are the raw rock rusher building, the rock storage house, and the drier building, each with a portion of the wall cut away so that the machinery within may be seen. A single unit employed in the process is shown to avoid confusion, and enable the observer to glean an idea of the process itself rather than an appreciation of the size of the plant or the immensity of its output. For example, in the raw rock crusher building a single gyratory crusher is located under the rock bin; an elevator which carries the crushed product to the top of the building, and a belt conveyor which delivers the product to the crushed rock storage house next door. From the bottom of the building in which the rock is stored another conveyor carries some of the material to the next building, where it is dried.

Around the corner is the raw mill where the dried rock is pulverized, then come the kilns, where the pulverized rock is burned, the product being known as the "clinker." Next in order are the coolers and the clinker storage house. Turning the corner the gypsum storage house is to be seen, where is kept the crushed gypsum which is added to the clinker to retard the setting time of the finished cement. Following this building is the finish grinding mill, where the clinker and gypsum are pulverized, forming Portland cement, and then one comes to the stockhouse, and finally the packing house.

Corrugated Iron for Roofing in South Africa

The great majority of the houses of Natal, whether public buildings, stores, dwellings, warehouses or stables, are roofed with corrugated iron, and the same material also enters to a large extent into construction generally. The principal cause of its popularity, says Consul W. W. Masterson, writing from Durban, South Africa, is probably the weather, as the place is in the semi-tropics.

Tiles are used in fair quantities for the more pretentious houses and other roofing material is occasionally utilized and sometimes patent American roofing of different kinds.

Metal ceilings are as rarely used as metal shingles. Plaster with plaster-of-Paris ornaments are principally used for the more ornamental ceilings. There are also quantities of what might be called *papier mache* ceilings in use, this material coming in squares of 1½ to 2 ft. and in appearance closely resembling a metal ceiling.

Details of Decorating Wall Board

Presenting a Chart Giving Several Decorative Schemes for Every Room, with Suggestions for Floor Coverings

By Joseph A. Poesl

IF you glance through the newly finished and undecorated rooms of the ordinary flat dwelling you will observe blank expanses of white walls with only doors and windows to relieve the monotony. In such a building however which has its walls covered with wall board you will find in the kitchen, a wall board tiled wainscot, a plate rail in the dining room, nicely paneled walls and ceiling in the living room and so on throughout the house. Every room will be found treated individually, distinctively; yet all will be in harmony with one another. You will see, too, the wainscot cap, chair rail, plate rail, picture molding and other moldings component parts of the walls themselves; not mere fastenings.

The first presents the more difficult problem—that of treating the blank walls in such a manner as to make them pleasing, and to employ decorative schemes suitable for each type of room—to make the living room look like a living room and the dining room look like a dining room.

All this is solved by proper paneling in the case of the wall board house. The decorator must, however, include in the schemes he prepares more different colors for the various wall divisions which have to be in harmony, the type of stencils suitable and their color.

Here is a chart that will help in this direction. It gives several decorative schemes for every room in the house, including suggestions for floor coverings and draperies. In the use of the chart, it must be borne in mind that the size of a room is apparently affected by various colors. Also, rooms facing the South should have a different treatment from those having a Northern exposure.

One advantage of the present day wall board over plaster is that it can be decorated satisfactorily with but two coats of paint without sizing. It is unsafe to apply paint over freshly plastered walls as the free lime therein will act upon the oil and produce a soap. In time the air neutralizes the lime when sizing and painting can be done without danger. Experts advise three years would not be too long to let plaster dry out; at least one year should elapse. On the other hand, the decoration of wall board can be performed just as soon as the Board is on. This means the occupancy of a completely finished house much sooner than if it were plastered.

Some wall boards have a finished surface, grained or otherwise, which produces fairly attractive rooms without further decoration. These however, may be painted or wallpapered to suit if the natural finish is undesirable.

Do not misinterpret what is meant by wallpapered. In order to decorate a room to be finished with wall board with wallpaper, an appropriate panel arrangement should first be planned out for it, just as for painting. The wallpaper should be put on and wooden decorative strips put over every panel



No. 4 No. 1 No. 2 No. 3

Details of Decorating Wall Board—The Numbers of the Panels Correspond with Those in the Column of the Accompanying Chart Headed "Design Number"

joint. Of course, more than ordinary care is necessary in doing this so that the pattern of the wallpaper is correctly centered in the panels. This is the only method for using wallpaper on wall board which has proven anywhere near satisfactory. Never attempt to do so without decorative strips over the joints of the panels.

Speaking of wallpaper, it is not recommended at all in connection with wall board, for the reason that it is not as sanitary as paint. It has been barred on that account from numerous hospitals.

The greater portion of wall board used requires painting or some other decoration. But inasmuch as nearly all is surface sealed and sized, it is possible to obtain a good finish with only two coats of paint. That which is unsized should receive an application of varnish size to stop all suction before paint is put on. Glue size is not suitable being so readily affected by moisture which loosens it and causes the paint to drop off.

The manner in which this is done often determines the result of the job, whether good or bad. To do this best, instruct the carpenter beforehand to carefully set the brads just slightly under the surface of the board. Then fill the depressions with filler, scraping and removing the surplus that is not actually needed to level off the hole. If the plaster of paris and dextrine filler is used, it is absolutely essential that it be allowed to dry for twenty-four hours before paint is applied over it. This is so, because the surface hardens quickly while there is still much moisture in the body which must come out somehow. And if paint is on before it has come out the paint will be affected and discolored.

After the filler is dry apply the first coat of the selected color of paint. Allow twenty-four hours to elapse before putting on the next coat. In the case of darker colors, this would give an excellent finish; lighter colors will require three coats.

To be sure, this procedure is only for the simplest

COMPLETE DECORATIVE SCHEMES FOR PANELED WALL BOARD ROOMS

	Design Number	Dado	Field	Frieze	Ceiling	Stencil	Dec. Strips—Trim	Draperies	Floor Coverings
Living Room	4		Nile green		Cream	Lt. green and maroon	Bog oak-Ft. white	Maroon	Green
	4		Dk. tan		Cream	Tan-Green	Wtd. oak-Ft. white	Lt. green-Tan	Brown
	4		Buff		Cream	Grey-Brown	Wtd. oak-Ft. white	Dk. red-Green	Brown
	1	Dk. tan		Cream	Cream	Green-Brown	Wtd. oak-Ft. white	Green-Maroon	Brown
	1	Nile green		Cream	Cream	Green and brown	Dk. oak-Ft. white	Brown	Green
	3	Nile green	Lt. green	Cream	Ivory	Green	Bog oak	Dk. green	Green
Dining Room	1	Delft blue		Cream	Ivory	Dk. blue	Mission-Ft. white	Cream	Dk. blue
	1	Dk. tan		Cream	Cream	Green-Brown	Wtd. oak-Ft. white	Green-Maroon	Brown
	1	Nile green		Cream	Cream	Green and brown	Wtd. oak-Ft. white	Brown	Green
	2	Delft blue	Light blue		Ivory	Dk. blue	Ft. white	Lt. blue	Blue
	3	Dk. tan	Buff	Cream	Ivory	Green and brown	Wtd. oak-Ft. White	Green	Brown
	4		Tan		Cream	Lt. green-Maroon	Wtd. oak-Ft. white	Brown-Green	Brown
Library or Den	1	Maroon		Buff	Cream	Green-Maroon	Mahogany-Ft. white	Dk. green	Maroon
	2	Cho. brown	Lt. tan		Cream	Brown-red	Bog oak-Ft. white	Lt. green	Brown
	4		Chocolate		Cream	Lt. green-Tan	Wtd. oak-Ft. white	Lt. green-Tan	Dk. brown-Green
Bed Rooms	1	Old rose		Buff	Ivory	Grey-Rose	Old rose-Ft. white	Pearl grey	Old rose
	1	Lt. blue		Cream	Cream	Blue	Blue-Ft. white	Blue	Blue
	1	Pink		Ivory	Ivory	Lt. grey-Green	Ft. white	Grey	Grey and green
	2	Lt. tan	Dk. cream		Cream	Tan-Green	Wtd. oak-Ft. white	Green	Brown
	4		Paynes grey		Ivory	Old rose-grey	Grey-Ft. white	Old rose	Grey
	4		Old rose		Ivory	Maroon-Grey	Mahogany-Ft. white	Maroon-Grey	Old rose-Grey
	4		Paynes Grey		Ivory	Old rose-White	Wtd. oak-Ft. white	Old rose	Grey
	4		Lt. yellow ocher		Cream	Brown-Green	Wtd. oak-Ft. white	Green-Brown	Brown
	4		Md blue		Ivory	Dk. blue-White	Blue-Ft. white	Dk. blue-Ivory	Dk. blue
	4		Delft blue		Lt. blue	Lt. blue	White	Dk. blue	Blue
	1	Pearl grey		Ivory	Ivory	Grey-Old rose	Sil Gry.-Ft white	Old rose	Grey
Hall	2	Nile green	Lt. green		Cream	Green	Wtd. oak-Ft. white	Brown	Green
	2	Dk. tan	Lt. tan		Cream	Green-Brown	Wtd. oak-Ft. white	Green	Brown
	4		Lt. tan		Cream	Green-Brown	Wtd. oak-Ft. white	Green-Brown	Brown
Bath	2	White en.	Md. blue		Ivory	Dk. blue-White	Ft. white	White	Blue and white
	2	White en.	White		Ivory	Md. grey	French grey	Grey and white	Grey
Kitchen	2	White en.	Dk. buff		Cream	Lt. brown	Natural-Ft. white	White	Md. brown
	2	White en.	Delft blue		Lt. blue	White	Ft. white	White and blue	Blue

Details of Decorating Wall Board—Chart Giving Several Decorative Schemes for Each Room in the House

Prepared paints in sealed packages are probably the most economical and convenient to use. It is well, though to select a brand made by a reputable manufacturer. Thereby one can be assured of satisfactory results—the name of the maker being the guarantee. Most home owners are to-day demanding washable flat oil paint for their interiors, feeling the effects obtainable with it are not alone artistic, but sanitary also. Wall board is perfectly adapted to it, and its slightly rough surface lends further beauty to the decoration. On plastered walls stippling is used when the same effect is sought.

In the decoration of wall board it is first of all necessary to stop, or fill, the brad holes in the center of the panels. Putty can be used for this purpose, although regular nail head filler, made of three parts of plaster of paris and one part dextrine mixed to the consistency of putty with water, is better.

The filling of brad holes is perhaps the most important of operations in decorating wall board. The greatest carefulness as well as skill are demanded. class of work. Should those beautiful plain or mottled tiffany glazing effects be desired, a ground color of flat oil paint should be applied right after the filler has dried sufficiently. When this has also become dry, put on the glazing liquid into which the proper quantity and combination of artists colors has been mixed. As every good decorator knows, glazing liquid is first brushed on and then produced into that tiffany effect by means of a piece of burlap or cheesecloth crumpled loosely in the hand, daubed over the surface in a peculiar rotary motion.

There is practically no difference in the method of supplying water paints and that of oil paint. Although not so durable, this kind of paint is preferred by many owing to its cheapness, which allows of frequent changes in decoration. At one time its artistic finish was another reason for its use, but today flat oil paint is made to produce identical effects.

Nearly any form of decoration can be carried out on wall board more satisfactorily than on plaster.

The very same methods as used on plaster, except the omission of sizing, are followed. It can be easily enameled, especially with wall board tile, if this is desirable. Stippling, hand painting and graining are possible. Any wood or marble can be reproduced on its surface. The skill and ability of the decorator is the only limit.

In wall board rooms stencilling is almost a necessity. The paneling demands it. Stencils are inexpensive, and for the enhanced artistic effects obtained by their use the application cost is well compensated. Simple stencils are easily cut out of oiled paper by even the unskilled.

There is more woodwork used in wall board rooms than in plaster, due to the decorative strips at the intersections of the panels. For this reason it is left off until the board has been completely decorated. These should be finished to match the door casings and other woodwork. Sometimes, however, the strips are painted in the same color as the board, which is a rather pleasing treatment. This can be done with stained and varnished or waxed trim. When the strips are painted in contrast to the board all woodwork should be alike in treatment.

Estimates for decorating wall board should be prepared with the understanding that no size is to be used, for very little unsized wall board is being sold now. It is always best to make sure, however, which must be figured on. There are also a large number of nail heads in the panels that must be filled and more woodwork to be finished, which should not be overlooked.

An Attractive Cottage at San Antonio

A Design and Arrangement of Rooms Carefully Worked Out by the Owner and His Builder

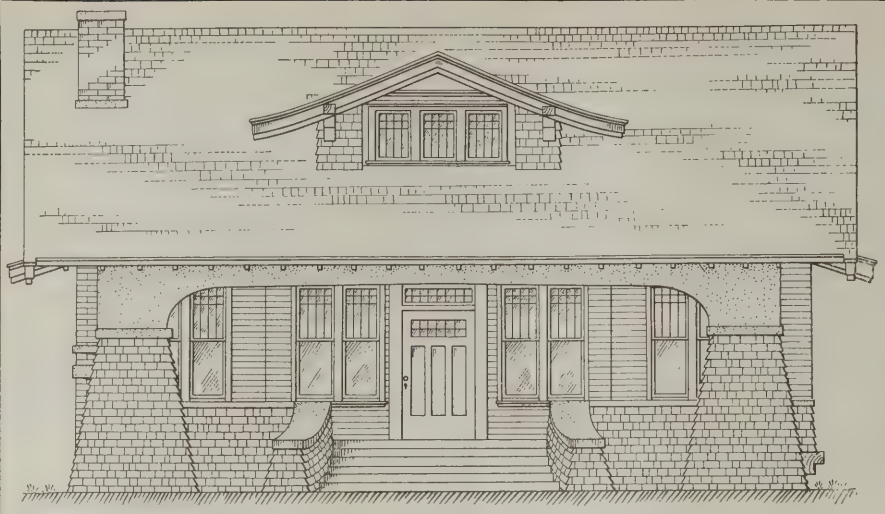
FEW sections of the country are more in the public eye just at present than the extreme Southwest, and it may not be without interest to many of our readers to bring to their notice at this time an excellent example of the cosy-cottage type of architecture to be found in some of the more important cities of the border States. The selection which we have made is a frame dwelling of well-considered exterior and involving an arrangement of rooms both convenient and compact. Noticeable features of the exterior are the treatment of the porch with its shingled buttresses, the attractive dormer window immediately over the main entrance, the roof effects with composition shingles placed 6 in. to the weather, and the clever manner of handling the exterior details in general.



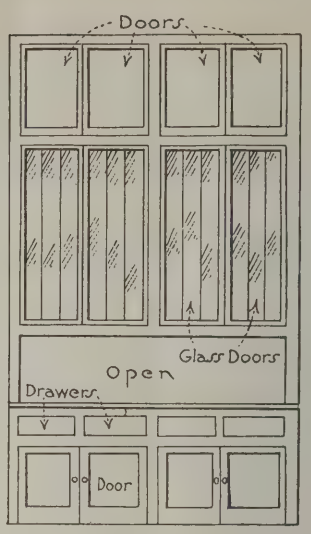
General View of the Cottage of Clyde V. Lancaster at San Antonio, Texas

Within, there are on the main floor a living room, occupying a large portion of the front; a "den" with its open fireplace; a commodious dining room with its recessed triple window and seat; a kitchen communicating with the dining room through a large pantry fitted with china closet; a conservatory opening immediately out of the dining room; a large bedroom with recessed window and seat corresponding to that of the dining room; a bathroom, and a rear bedroom, which is reached from the passageway with which the three rooms on that side of the house communicate.

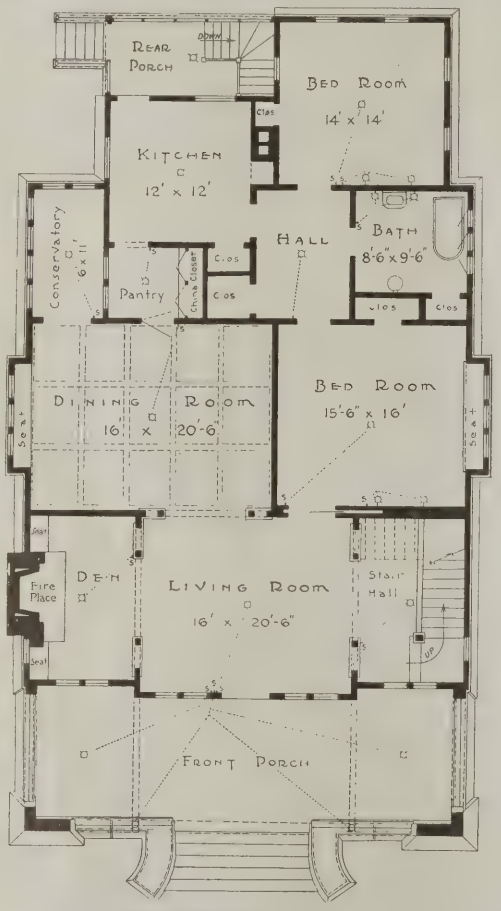
The location of the cottage is San Antonio, Tex., and owing to the peculiar formation of the soil in that particular locality the building is placed on the usual Texas foundation—cedar posts. These posts are 8 in. in diameter, are set on and imbedded in concrete piers 18 in. thick and 3 ft. sq., resting on



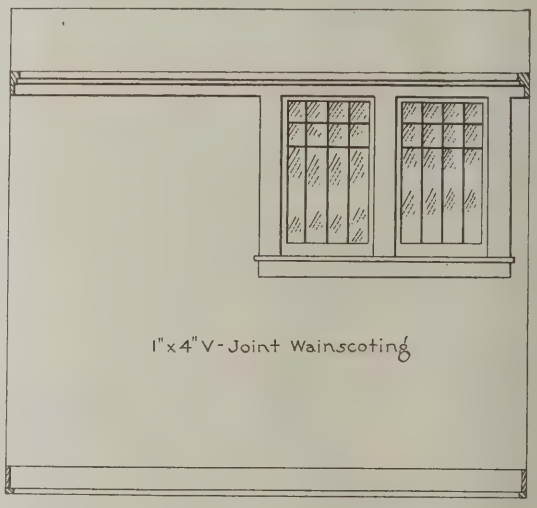
Front Elevation of the Cottage—Scale 3/32 In. to the Foot



Elevation of China Closet —Scale ¼ In. to the Foot



Floor Plan—Scale 1/16 In. to the Foot



Elevation of Side of Conservatory Looking Toward the Two Windows Which Light the Pantry—Scale ¼ In. to the Foot



Elevations of Three Sides of Conservatory, Including the Doors to the Dining Room—Scale ¼ In. to the Foot

An Attractive Cottage at San Antonio—Plan, Elevation and Miscellaneous Constructive Details

a clay bottom. The posts being anchored in the concrete serves to prevent to a minor degree at least shifting with the soil above the clay, which seems to be the trouble in many cases with foundations in that locality.

The sills under the outside walls are 6 x 8 in. and the cross sills are 2 x 12 in. doubled. The floor joists are 2 x 10 in. resting on the 6 x 8-in. sills and on a 2 x 4 in. strapped to the 2 x 12-in. sills, and are all securely spiked. The studs are 2 x 4 in. doubled and reinforced at the corners, with doubled 2 x 4-in. plate. Ceiling joists are 2 x 6 in., the second story not being finished.

All walls are ceiled inside with 1 x 6-in. shiplap and the same material was used for the overhead ceilings. No building felt or sheathing boards were used on the outside studs as the owner deemed the shiplap siding to be sufficient covering for that climate. The siding was round edge or "No. 117," as it is familiarly known in that section of the country.

The shingles below the belt course, also in the gable ends and on the porch, are of cypress and were painted after they were put on. The shingles are exposed 4½ in. to the weather.

The 2 x 4-in. rafters of the roof were covered with 1 x 6-in. sheathing boards laid close together, and on these in turn were placed Rex-tile shingles exposed 6 in. to the weather.

The floors are of single thickness and are laid with 1 x 2-in. selected rift-sawed pine. The interior trim is all long leaf yellow pine, especially selected as to grain, and with the exception of the bathroom and the conservatory is stained a dark oak and varnished. The floors are also stained dark oak, but a little lighter shade and are varnished. The bathroom and conservatory are finished in white enamel.

The doors throughout are of pine of Morgan Co.'s Craftsman "G" pattern.

Great care was used by the contractor in matching the grain of the interior trim and bringing out the beauty of the wood. Every piece was hand finished and the only mill work in the house are the doors and the windows. The stain and varnish brought out the grain of the pine with such splendid effect that the owner states it is hard to believe the entire trim is not of oak.



View in Living Room of Mr. Lancaster's Cottage at San Antonio Looking Toward the Fire Place in the "Den," while at the right is the Dining Room

The hardware is of Yale & Towne make and is of plain square brass design.

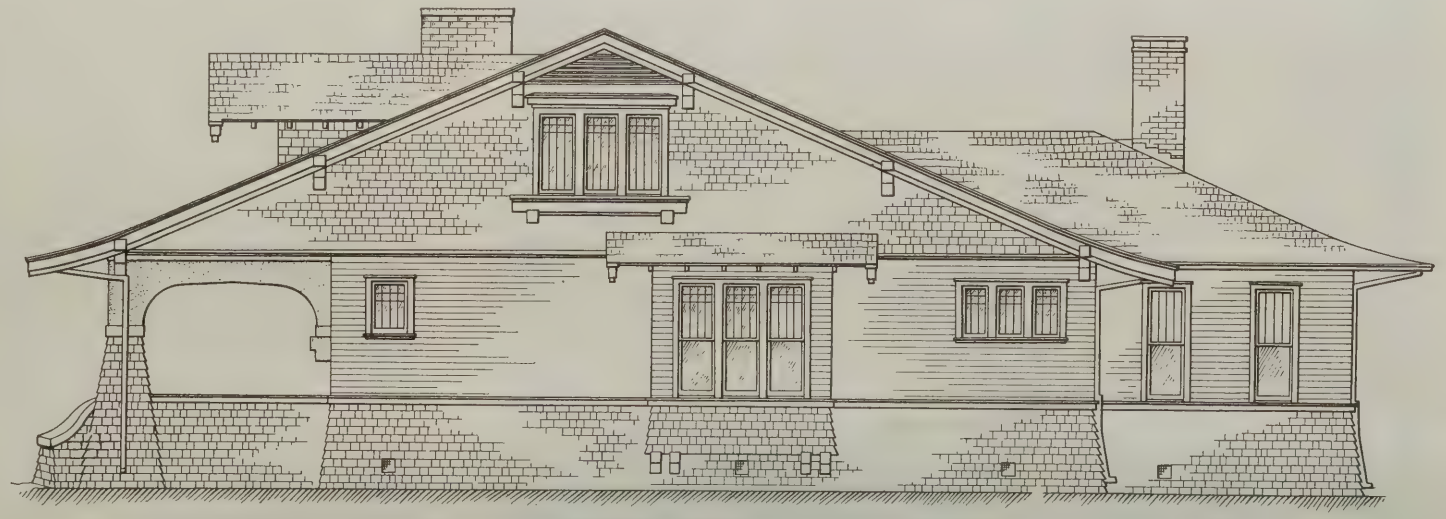
The color of all shingles except those on the roof is moss green; the walls and roof trim are ivory white, while the roof itself is clay red, all harmonizing in a most pleasing manner. The screen frames are black.

The chimney is of red pressed brick of local manufacture and the mantel is of reddish brown tapestry brick. Black mortar was used throughout with beaded joints on the exterior and raked joints on the mantel.

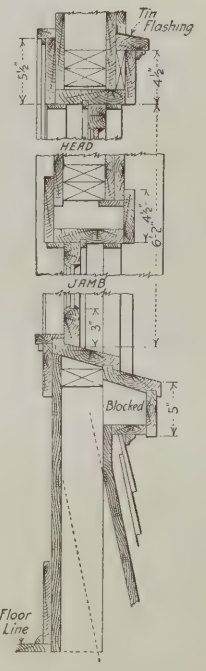
An examination of the plan will show the position the stairs to the second story were intended to occupy, but in building the house no stairway was erected, although if additional sleeping rooms be-



Left Side Elevation of the Cottage Showing the Outside Chimney and Extension Window in the Dining Room, also the Four Windows Forming One Side of the Conservatory—Scale 3/32 In. to the Foot



The Right Side Elevation Showing Triple Extension Window in One of the Bed Rooms—Scale 3/32 In. to the Foot



Vertical and Horizontal Sections Through the Window Frames.

Scale ¾ In. to the Foot

Two Side Elevations and Window Details of Cottage of Mr. Clyde V. Lancaster at San Antonio, Texas

come a necessity it will be a simple matter to complete this feature. Instead of the stairway two casement sash were put in with three transom sash between, the whole scheme being worked out in a way to produce a pleasing effect from the exterior as well as from the interior.

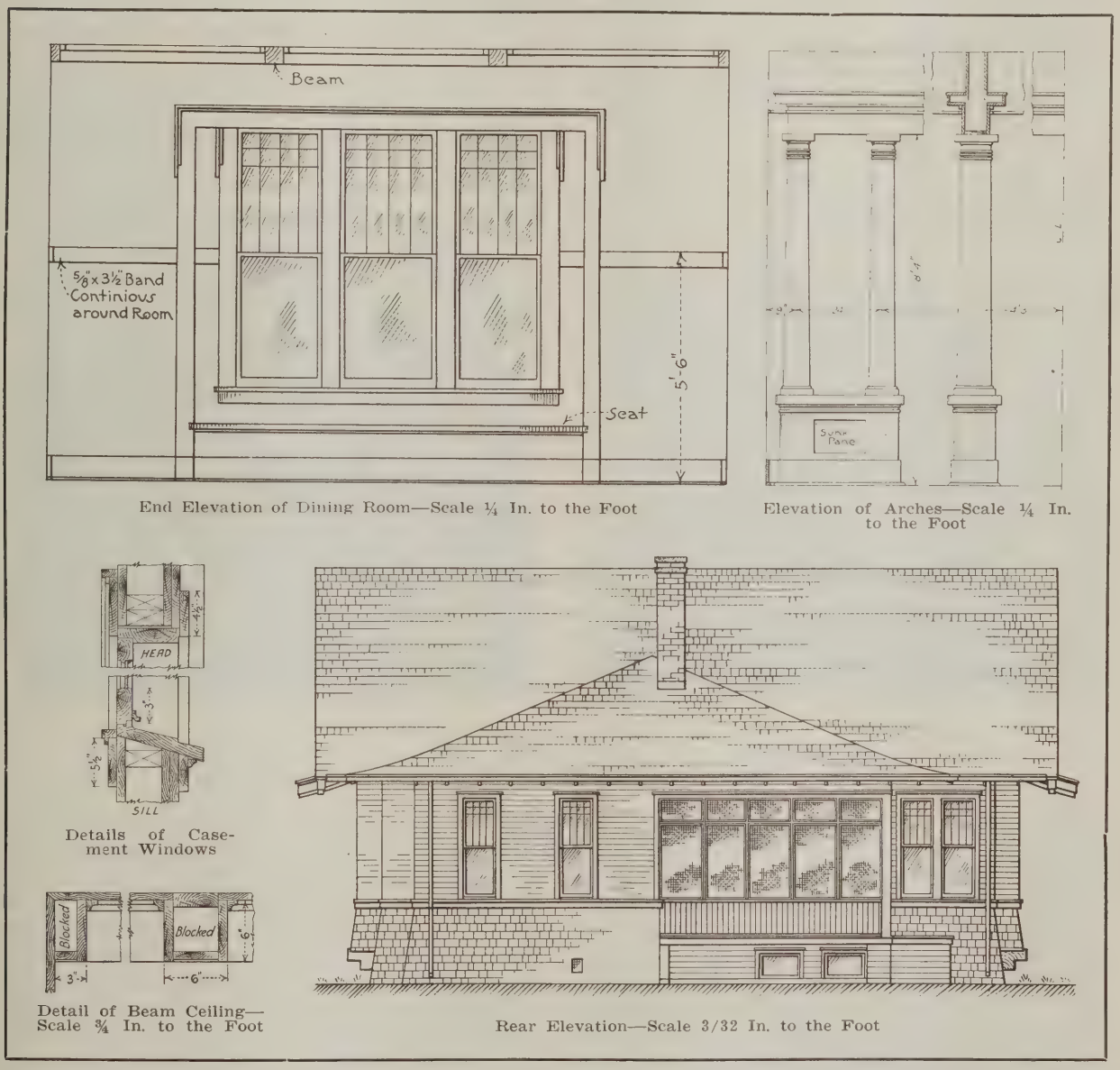
The cost of various parts of the work as furnished by the contractor was as follows:

Excavating and placing concrete piers.....	$97.00
Cement, sand, etc.....	53.00
Brick work	210.00
Materials—lumber, shingles, etc.....	2,450.00
Carpenters' labor	1,350.00
Painting and varnishing.....	215.00
Papering	114.00
Electric wiring and fixtures.....	146.00
Total	$4,635.00

In this connection it is interesting to state that the Rex-tile Shingles used on the house were applied by the Turner Roofing and Supply Company of San Antonio, the local agent of the Flintkote Manufacturing Company of Boston, Mass.

Federal Aid for Trade Schools

That the business interests of the country are in favor of federal aid for vocational education is indicated by a preliminary count of the votes cast in a referendum just taken by the Chamber of Commerce of the United States. Three hundred and fifty-three commercial organizations, chambers of commerce and boards of trade in forty-two States, Alaska, Hawaii, the District of Columbia, and the American Chamber of Commerce in Paris, France, participated in the ballot. According to Elliot H. Goodwin, the general secretary of the National Chamber, the four recommendations put forth by a special committee of which Frederick A. Geier of Cincinnati is chairman, were carried by the two-thirds majority necessary to commit the National Chamber.



Elevation and Miscellaneous Constructive Details of Cottage of Mr. Lancaster at San Antonio, Texas

The cottage here illustrated is the home of Clyde V. Lancaster, who states that much of the credit for the design is due the general contractor, Charles L. Eckles, 1814 Buena Vista Street, San Antonio, Tex., who collaborated with him in carefully working out the plans.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Why the Chimney Tops Overhang

From E. S. W., West Lynn, Mass.—In the issue of the paper for September, 1915, there appeared a question by "E. A. N." asking why certain chimney tops overhang and why their leaning is toward the east. The comments which follow were prepared some time ago and I went to considerable expense in obtaining the pictures illustrating the points discussed, but the article to clearly explain my views became so voluminous that I withheld it. In the May issue of THE BUILDING AGE, however, the letter of "W. B. B.," together with the inquiry of "W. W.," Baltimore, Md., concerning creosote in the old brick work having spoiled his paper hanging, have caused me to decide to send along for publication what I had previously prepared.



Fig. 1—A Sturdy Example of a 17th Century House

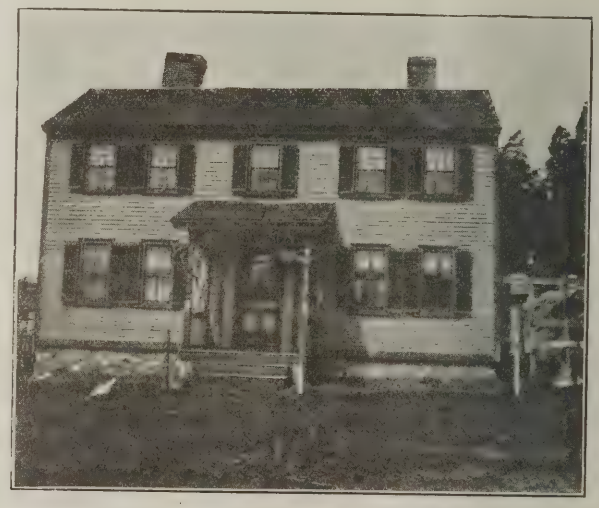


Fig. 2—House Built About the Middle of the 18th Century

Why the Chimney Tops Overhang—Some Rather Striking Examples

The conditions necessary to produce the effect described by "E. A. N." are freezing temperature and long service as a conductor of smoke. Along with this is the location of the flue in general use where more than one flue is nested in the chimney's top. This gives the direction to the lean. The initial cause of the bending is the condensation of the warm gases which arise in the flue when starting up the fire, striking the cold wall of the chimney top. This creosote is very destructive to the crystalline hardness of the mortar, destroying both its adhesive and cohesive strength. It thus permits the mortar to retain moisture and expand with the action of frost and so beginning at the top and successively working downward, as year by year the creosote destroys the value of the mortar, Jack Frost, with his mighty lever working on the cold side, tips the chimney over on the opposite warmer side, producing the curved or bent effect one can see all around him. In proof of this statement I submit the following facts.

A chimney not used for smoke but as a ventilator never bends; so also one built with flue lining rarely bends, however old.

A summer residence which has been closed from October until May for many years past has thus far required no repairs to its chimneys, but at the winter home of the owner 15 miles away the chimneys are all bent. An examination of one of these bent tops shows on one side the joint to be full, tight and level; on the opposite side the joint is large, loose and partially gone from under the bricks, while on both adjacent sides the joint varies both as regards size and tightness. It is out of level, curving upward as the top tips over. On demolishing the chimney the mortar was found discolored by the creosote—no adhesion—the mortar coming off easily and clean from the brick. It is also to be noted that the mortar crumbles easily and readily breaks apart, this being true in a lessening degree as one worked down from the top, until below the roof all changes. Here the mortar is hard, tight and requires strong blows to separate it. Upon rebuilding with this old brick the little excess of water, instead of being absorbed into the brick, flows on the surface and the work remains wet some time before jointing can be finished.

Old chimney brick are often found in new construction work and are sure to be placed on the inside face of the wall. Here they soon show dark and damp and when covered with "whitewash" show through a dirty brown spot on a white wall, and

very often have to be dug out and cast aside. This is the creosote in the brick again making trouble. So also a relaid chimney top will not stand as long as when first built. The bricks now contain a volume of this "oily creosote" and are in a condition to give it up to the mortar joints. It requires some time to get into this condition when bricks are fresh and new.

The agents, creosote and frost, are free to act on all four sides of a chimney flue, and while the creosote does affect all the joints from the inside, the warm gases on the inside and the sun's rays on the outside modify by drying the effect of the cold on the easterly and southerly sides while it is exerting its full expansive force on the other two sides. As the shape is a rectangle, this causes a bend on the side opposite from which the cold air comes.

Now I have said the location of the flue in general use governs the direction of the bend in chimneys of more than one flue, for the partitions in such a top are but seldom connected with the outer wall and no amount of expansion of these joints will bend the shaft. The expansion must be in the joints of the outer wall to have this effect.

In the earliest frame structures in this country the chimneys were huge affairs, often 6 to 8 ft. square at the base, with tops 3½ ft. square above the roof and having four to six flues. It is evident that the flue in general use must come in a corner or center of this top, and the outer wall at best only made one-half of the flue and was but a small part of the top, so that its bulk resisted the tipping effect and the chimneys remained fairly erect.

The picture, Fig. 1, shows one of these old seventeenth century settlers with large chimneys. From this house George Jacobs, a victim of the Salem witchcraft delusion, was in 1692 taken to be executed. The house has always been used as a habitation, and it is interesting to note how sturdy and erect it is. There is no knowing how many years have elapsed since it was overhauled or repaired.

The picture, Fig. 2, represents another fine example built about the middle of the eighteenth century. The change from the single stack to the smaller two-chimney style may be seen. These tops are 24 x 40 in. with three flues in each. The effect at the top of the flue in general use is to be noted. Here this flue is the outside one in each chimney, and the expansion of the joint, being at opposite sides of the chimney, heels the tops over toward each other.

Contrast this with the picture, Fig. 3, showing a house built about 1850. These tops have two flues, each 20 x 28 in. Here the flue in general use is the inside one or toward the center of the house. Again the expansion in the joint is opposite in each chimney, and these tops are tipped away from each other. It is plain to see in Figs. 2 and 3 which chimney, by its bend, is mostly used, and they are here shown to prove that in chimneys of more than one flue, location gives the direction to the bend.

In Fig. 4 is pictured a rare case, representing as it does a house built about the same time as the one shown in Fig. 3. There are two flues in this chimney, 16 x 36 in., but the bend is over the narrow side. The flue mostly used is the right-hand one. These joints, damaged by the creosote, expand with the frost and tip the 36-in. side, as seen, toward the east. In the nineteenth century many chimneys were built with single flue, and satisfactorily answered for several fittings. One has only to look about and see everywhere how they bend and the direction. When the bend is in a direction other than that opposite the cold quarter, look for the cause.

The corners of a rectangle act as a buttress and prevent the leaning in one fixed direction; therefore, the bend is over the side most nearly opposite the cold quarter, which may vary about a quarter of a circle. Doubtless, if chimneys were built circular in shape, both inside and outside, the lean would be in the same direction in a given locality, except where some protection is found to shield it from the cold air. This we occasionally see in the single-flue top when it leans west or north.



Fig. 3—House Showing Tops Tipped Away from Each Other



Fig. 4—Chimney Showing Bend Over the Narrow Side

Why the Chimney Tops Overhang—Two Very Interesting Examples

Some Comments on Mortar for Brick Work

From Norman G. Hough, Pittsburgh, Pa.—The writer has read with a great deal of interest Mr. W. H. Hefelfinger's treatise on mortars for brick and stone masonry in the last issue of your publication, and has noticed in particular his statements relative to lime. We feel that in treating this particular phase of the subject Mr. Hefelfinger has unintentionally made certain statements which may have a tendency to place some of the best known brands of lime in disfavor in the building world. This letter is therefore prompted with the idea of correcting any erroneous impressions that might be formed by anyone reading Mr. Hefelfinger's article.

The statement is made that "We must take lime as it comes." The American Society for Testing Materials has standard specifications covering both quicklime and hydrated lime, and it is unnecessary to take lime as it comes but rather orders may be placed for lime that will pass the American Society for Testing Materials specifications, and the buyer may rest assured that he is getting a material which is manufactured in a highly scientific manner, and is a material which will do the work he anticipates. The American Society for Testing Materials has set a standard for manufacturers of this commodity, and the manufacturers are producing materials which will meet the set standard.

The statement is also made that any magnesium carbonate contained by limestone is classed as an impurity. Further, statement is made that some limes contain 35 per cent magnesium carbonate, and that this makes it a poor lime and also that this impurity can be considered only as an adulterant. Lime which is manufactured to meet the A. S. T. M. specifications contains no magnesium carbonate. Upon proper burning of limestone, the magnesium carbonate changes to magnesium oxide. By referring to the A. S. T. M. specifications for lime one finds that the magnesium oxide is not classed as an impurity and cannot be so considered. The magnesium oxide in the mortar, contrary to Mr. Hefelfinger's statement, does undergo chemical change by absorbing carbon dioxide from the atmosphere in the same manner as does the calcium oxide, thus reverting back to magnesium carbonate, which has a value in giving strength to the mortar.

Referring now to the statement that lime containing 35 per cent magnesia is what is known as a poor lime. The fact of whether or not a lime is rich or lean is determined, not so much by the chemical analysis, but by the working quality of the lime. The term "fat" is employed by users of lime more to describe the working qualities of the lime.

In stating the characteristics which a good lime should possess, Characteristic No. 1, according to the author's statement, made earlier in his article, bars from use some of the best limes in the market.

The first requirement reads as follows: "Freedom from clinkers and cinders and with only a small percentage of other impurities." Earlier in his article Mr. Hefelfinger states that magnesium carbonate in lime is an impurity; we have already shown that magnesium carbonate upon burning, becomes magnesium oxide and this is not an impurity, but wish to go one step further and state that tons of lime high in magnesium oxide are being sold daily, and we have yet to learn of a case where it is not performing the functions for which it was purchased. What the author probably refers to is aluminum, iron, and silicon.

Characteristic No. 2 states that the lime should be free from dust. All limes, either quick or hydrated, are dusty and would not be classed as good limes if they were not so.

Characteristic No. 4 states that the lime should dissolve in soft water. All limes made to meet the American Society for Testing Materials specifications will dissolve in water, either hard or soft.

The statement is also made that poor limes may be used for mortar for brick and stone work, but should not be used for plastering. Earlier in his article the author defines a poor lime as one containing a large percentage of magnesium oxide. At nearly every builders' supply house east of the Mississippi River, also many cities west of the river, one will learn upon inquiry that high magnesium limes are being used for plastering. We can point out many jobs to the author which are at this time being plastered with high magnesium limes, for scratch, brown and finish coats. Some of the best known brands on the market to-day are high magnesium limes and are being sold for plastering purposes.

While on the subject of mortar for brick work, it is in order to call attention to the results of an investigation conducted at Columbia University by James S. Macgregor, professor of civil engineering, in which is determined conclusively the most economical mortar to use, together with the highest construction value.

Water-Proofing Joints in Granite Coping Stones

From M. C. F., Roanoke, Va.—Will some of the practical readers tell me the best packing for joints in granite coping stones? I have used cement in packing joints of this work, but find that there is more or less leakage, causing discoloration of the work below the coping. This is very undesirable, as might naturally be supposed, and if anyone can suggest a remedy I shall be very glad to have the information. It must be understood that the contraction of the stone and the cement is not equal, thereby causing the separation of the two materials.

Cleaning an Oil Stone

From A. J., Milwaukee, Wis.—Kindly give me a method of cleaning an oil stone. A carpenter told me to burn the stone out in fire, and I wish to know if fire will do any harm to the stone?

Answer.—Various methods of cleaning an oil stone have been suggested by readers from time to time in some of the back numbers of THE BUILDING AGE. One suggests that the stone may be heated in an oven until the oil has all oozed out and then wipe it off with a clean rag. Boiling in soft water for about 30 minutes is another method, while several readers have stated that good results may be obtained by boiling the stone three or four hours in concentrated lye. Others, however, object to this as tending to disintegrate the materials of which the stone is composed.

Another way is to cover the stone all around with about a 2-in. thickness of soft clay, packed tightly; then place the stone in a hot oven.

All these methods are claimed to remove the bits of steel which have entered the pores of the stone, causing it to glaze. If the correspondent above will carefully wipe his stone with a clean rag after using, so as to clean off the bits of steel and keep them out of the stone, it will not glaze or dull so quickly as it will without proper care.

Criticism of Ten-Room House

From Arthur Weindorf, Long Island City, N. Y.—I have carefully read what the correspondent signing himself "Ten-room Twin House" has to say on page 54 of the May issue of THE BUILDING AGE, and in reply to his invitation to criticise his plans and elevation I suggest that the front wall be built of hollow tile or concrete blocks and finished flat with stucco. This will avoid that cold effect generally seen in the use of concrete blocks. The only place I would use them is for factory construction, where they fit admirably.

A better effect will also be had on the exterior and interior by grouping the windows as shown on the sketches. I also suggest, if possible, keeping the entrances apart, as this will give more privacy to each tenant. This arrangement will require the plans to be reversed, bringing all the plumbing together, where all fixtures from both apartments can be connected to one line of plumbing and reducing the cost of it a trifle.

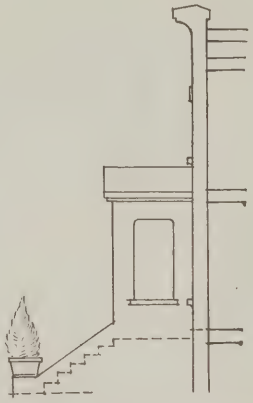
I do not advise casting in concrete the moldings, cornices, dentils, columns, caps, etc., as he suggests, as concrete does not lend itself readily to this form of construction, and it can only be done by building elaborate and expensive "forms." The material itself suggests broad surfaces and simple big masses and it should only be used in this manner to achieve the most effective architectural results. If detail must be added, this can be done by paneling and the inlaying of colored tiles or tapestry bricks, which will greatly enrich the surfaces.

In the use of concrete to cast molds and decorative surfaces, there is always lacking the artistic effect that one sees in the use of stone, wood and metal, which materials lend themselves more readily to this manner of forms and decoration.

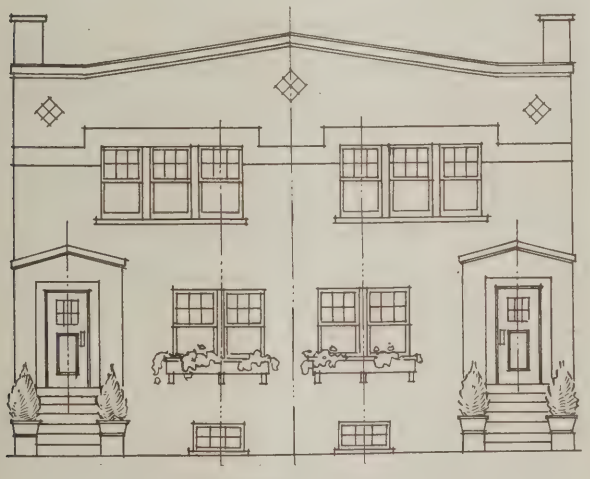
In the elevations I have submitted, dark green tiles or tapestry brick can be set in the surfaces above the second-story window head course to give sufficient decorative treatment.

The top window sashes can be divided as shown to give detail to the window openings.

The roof coping can be cast and extend 1 ft. 4 in. over the face of the building. The second story window head course should project ¾ in. This band, the entrance porch and roof coping, with the spots of colored tile above, will be sufficient to break up the surface of the wall and give the facade that simplicity of design that is not tiresome to the eye.



Profile of Front Wall and Entrance Shown Below



Preferable Arrangement of Front Entrances



Another Method of Grouping the Windows and Entrances

Criticism of Ten-Room House by Arthur Weindorf

Average Day's Work for the Carpenter

From O. K., Wapinitia, Ore.—The builder from Danville, while asking the question, "What Is an Average Day's Work," says that time and experience have not demonstrated the answer to his satisfaction. Expressing my sentiments I would say "the same right back at you, brother builder." If a satisfactory average could be found for one locality, it is very probable that it would not apply to some other owing to the difference in materials. I have worked in Wisconsin where our framing lumber was oak and maple that was well seasoned. There we bored a hole in the end of the hammer handle, filled

it with wagon grease and dipped the point of the nail in the grease before we started to drive it.

Then, too, I have worked in Colorado where the framing was all white pine. Some difference there, I can tell you.

Some jobs we secure we know beforehand that the work must be well and carefully done while in the case of others the customers do not expect to pay for first-class work. Some of the articles Mr. Hobart has been contributing will illustrate this.

Another point, and it is an important one in this connection, is that some days you are feeling just right, you whistle all day long and without paying very much attention to what you are doing you turn off an amount of work that surprises you and you are not especially tired either.

Again, you get hold of the wrong end of everything. You do not whistle, but concentrate your mind to the task and work as hard as you can. When night comes you are almost too tired to go home and you have not near come up to your average. You do not understand why; neither do I, but I guess it happens to all of us.

In looking back over my volumes of THE BUILDING AGE I find where one man put on 240 ft. B.M. of shiplap siding and the next day put on 500 ft. Sometime ago I was looking after a job where I had twelve carpenters working. There were two of that number whom I noticed in particular for where one was slow the other was fast, and *vice versa*.

When it came to laying floor, 3¼-in. tongued and grooved floor over a subfloor, with deadening felt between, Ed. would lay 3½ squares a day, but 2 squares was the best Billy could do. On the other hand when it came to hanging doors Billy averaged 9 every day while 6 was the most that Ed hung in any day. The doors were from 2 ft. x 6 ft., up to 2 ft. 8 in. x 6 ft. 8 in., made of fir of five-cross panel variety 1⅜ in. thick, and were hung with two 3½ x 3½ butts, which is the standard for all inside doors out here. This did not include putting on the locks.

There were 136 2-lt. windows in that building and Billy put in the most of them. He averaged sixteen a day.

So, I say, study your men. Where you find that a man is fast you will generally find that he likes that particular part of the work and that he does it well.

I had one man who could fit and hang sixteen doors in eight hours, although eight are considered a day's work—five if you put on the locks.

In making frames for windows to be hung with weights I can make one frame every hour and have found fellows who could beat that.

For the rest of it I will just about agree with "Contractor" from Moffitsville in the February issue although he gives a pretty wide latitude between some of his figures.

Let some one else tell us just what is the average.

Bevel for Rafters and Hoppers

From H. B. W., Washington, D. C.—In examining the diagrams on page 40 of the May issue of THE BUILDING AGE I find that a misprint occurs in connection with Fig. 4, that is *O—M* should be at right angles to *B—O* instead of on the line *R—O*.

An Hotel of Mammoth Proportions

Arrangements have recently been completed for the erection of a twenty-story hotel in New York City which will embody features of unusual interest to the building and architectural fraternity. Active operations are now under way and it is hoped to have the structure ready for occupancy before the close of next year. It will be built of granite and cream-colored brick and will harmonize in a general way with the mammoth Pennsylvania station, which it will face on Seventh Avenue. Above the three lower floors the building will be divided into four units, each a complete structure in itself measuring 54 ft. wide by 200 ft. in length and containing more than 500 rooms, so that the total accommodations will be something like 2200 rooms.

The four units will be connected by three smaller ones 50 ft. wide and 40 ft. long at a point about 90 ft. north of the Thirty-second Street frontage of the building. By this arrangement four large courts will be provided on the Thirty-second Street side of the building and four smaller ones on the Thirty-third Street side, thus giving every room natural light and air. The openings into the building from Thirty-third Street will be 40 ft. wide and 62 ft. long. The reason for the longer courts is to make the most of the southern exposure.

At the extreme end of the building will be another unit, but of smaller dimensions than those to the west. This unit will be 27 ft. wide, 200 ft. deep and nine stories high, and contain 250 rooms which will be set aside for the use of the large force of help necessary to run the hotel.

The main entrance will be through a series of six giant columns, three stories high, and will be the same as those in the colonnade of the railway station on the opposite side of the avenue. The six large columns will support a wide stone balcony which will be planted with hardy shrubbery and winter plants. There will also be five other entrances to the building, but none so imposing as the main approach.

The main floor of the building will have an area of 27,000 sq. ft. and all but 6000 sq. ft. of it will be required for the dining room, tea room and the palm room. There will be no great lobby as in other hotels, but there will be a number of settees and lounges on the floor overlooking the main entrance hall.

It is the present intention to build the main section of the structure, that is, the first three floors, and only two of the four large units, this portion of the work being estimated to involve an outlay of about $5,000,000. When the business of the hotel is such as to require the other two units they will be constructed upon the base section. It is estimated that the last two units will probably cost $3,000,000.

It will be known as the Hotel Pennsylvania, and the design is that of the well-known New York architects, McKim, Mead & White.

Several palatial residences are in course of construction in the Great Neck section of Long Island, N. Y., involving an outlay of about $5,000,000.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

In the Warren truss, Fig. 66, the stresses in the web members are alternately tension and compression, the light lines indicating tension and the heavy lines compression. Each panel is an equilateral triangle and in the figure the truss is a single system. By using another set of triangles and placing the trusses side by side so one triangle overlaps another by half the width we obtain a double system. Similarly we may use a triple system or a four system truss. When two or more systems are used the result is a Latticed Truss, Fig. 67.

Let W = total load on the truss, uniformly distributed.

P = load on each triangle.

n = number of triangles in the primary single system.

Then, in a single system truss, $P = \frac{W}{n}$

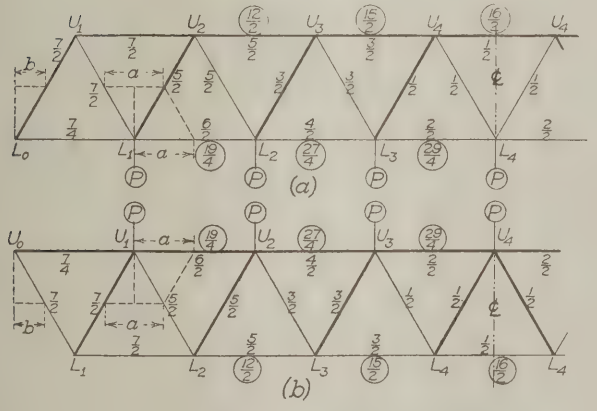


Fig. 66—Examples of Warren Trusses

figured as a frame, and the combined strength of the systems determines the strength of the completed truss. The systems are connected together at every joint where the members meet or cross. The lower apices are the panel joints when the load is on the lower chord, and the upper apices are the panel joints when the load is on the upper chord.

In Fig. 66 (a) the load is on the lower chord and (b) the load is on the upper chord. The truss is here assumed to be uniformly and symmetrically loaded. Coefficients may be written by starting from the center line of the span. On the upper and lower chords are placed the summation of the coefficients for the chords in the respective panels. In Fig. 66 (a) the coefficient for L_oL_1 is one-half that for U_1U_2, and in (b) the coefficient for U_oU_1 is one-half that for L_1L_2. The dotted paralellograms at L_o and L_1, and U_o and U_1, represent to scale the panel load set off vertically, with the paralellogram of forces completed by drawing horizontal lines to intersect the triangles. Then a = stress on U_1U_2 = stress on L_1L_2. It is twice b which represents the stress on U_oU_1 and L_oL_1. The thrust of the brace U_1L_o = the pull of the tie U_oL_1. It is resolved at the point of support on the abutment into a horizontal component along the chord, and a downward vertical component, which latter is resisted by the upward reaction of the abutment.

A usual ratio of depth to span in trusses is one-tenth, but circumstances may alter this. It may be used in the absence of computations to ascertain



Fig. 67—Two-system Warren Truss or Lattice Girder

In a double system truss, $P = \frac{W}{(2n) - 1}$

In a triple system truss, $P = \frac{W}{(3n) - 1}$

In a four system truss, $P = \frac{W}{(4n) - 1}$

Having found the panel load, P, each system is

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 53 of the May issue.

the economic depth and economic ratio of depth to span. For Howe trusses the best angle for the diagonals is 45 deg. When any different angle, which indicates a panel length greater or less than the depth, is adopted, the Pratt truss is better. For trusses of the Warren type the angle should be 60 deg.

Deflection is usually taken care of by making the horizontal panel length at the upper end ⅛ in. longer than the horizontal panel length at the lower end in every 10 ft. of span. This does not alter the lengths of the verticals, but does alter the lengths of diagonals, and when the truss is in place the bottom chord will be cambered upward. Were it perfectly straight it would appear to the eye to sag.

The amount of camber in inches is found as follows:

d = depth of truss in inches.
s = span of chord in inches.
c = camber in inches.

$$c = \frac{8d}{s}$$

In some of the figures of trusses the spaces are lettered. This is the system introduced by Mr. Bow for the graphical analysis of frames. The member is indicated by the letters between which it lies. In addition to this system of lettering the spaces the joints are sometimes numbered. The spaces are lettered to identify the member in the graphical analysis and the joints are numbered only when the detail drawing of the joint is to be referred to. Some of the trusses shown have the joints lettered with a capital U on the upper chord and a capital L on the lower chord. The subscript figure represents the number of the joint from the left end, the joint, or joints, at the abutments being O. In the drawings a joint is referred to by the U or L, and the subscript indicating the number of the joint. A member is identified by giving the letter and subscript number of the joint at each end of the member. This method of identifying joints and members is common.

Architects and designers of buildings have to deal with the simpler forms of trusses, but when it is desirable to introduce maximum economy into a design that truss is most economical in which the stresses in the chords are constant from end to end. This points to a truss having the general outline of a bow string girder. The top chord should be straight and not curved between joints. To obtain a curved outline for a roof it is easy to use fillers or vary the depths of the purlins resting on the trusses. For an exposed chord where the polygonal form would be unsightly the expedient is sometimes adopted of curving the segments, thereby introducing bent beams with arching action. This should never be done. It is better to use a false curved chord in segments to hide the short straight pieces.

(To be continued)

Mortars for Brick and Stone Masonry

Brief Reference to the Chief Characteristics of the Ingredients Entering Into Their Composition

By W. H. Hefelfinger



MORTAR may be divided into three classes, namely: cement mortar, cement-lime mortar and lime mortar. Cement mortar is strongest and best for any kind of work except for fire brick, but, owing to its cost, is only used in the best work and such work as sewers, foundations and work that requires waterproof mortar. Another reason pure cement mortar is not used more is because it is hard to use, especially in laying brick, but by adding some lime it becomes plastic and works easily. This is called cement-lime mortar, and is used in all buildings of any importance, especially those over two or three stories in height. Lime mortar is used chiefly in cheap dwelling construction, flats and small work not over two or three stories high. Lime mortar sets slowly, and in a building of any height, the weight of the walls would cause considerable settlement in the mortar. Portland cement cannot be used very economically in mixtures containing more than three parts sand to one of cement, except in stone work, where four to one may be used. Two parts sand to one of cement works very well. The proper way to make cement mortar is to first mix the sand and cement together dry and then add water and mix to right consistency. No more should be mixed at a time than can be used in three-quarters of an hour, as retempering after that decreases the strength.

(Continued from page 50, May issue)

The proportions of cement-lime mortar vary considerably, depending on the work to be done. They may be any proportion between 1 cement, 1/10 lime and 3 sand, to 1/10 cement, 1 of lime and 3 sand. The addition of lime up to about 10 per cent seems to add strength to the mortar, but after that lime weakens the mortar. The main thing to remember in cement-lime mortar is to get the materials thoroughly mixed. The cement should first be mixed with the sand and then the lime added. Never add cement to lime mortar, as it is very hard to get it thoroughly mixed. Hydrated lime works better than lime putty in making cement-lime mortar, as it may be mixed dry with the cement and sand, but one drawback to hydrated lime is that it sets up quickly. Architects and superintendents always have trouble in getting cement-lime mortar mixed to specifications, as it can readily be changed and they cannot tell from the appearance.

Lime mortar, being the cheapest, is used on all cheap work and is often very poor stuff. Lime should be slaked and allowed to cool before sand is added, so it will have a chance to slake thoroughly. The amount of sand that can be added depends upon the quality of the lime. Some lime will carry considerably more sand than others. The usual proportions are about three parts of sand to one of lime, but with good fat lime four to one may be used. The usual practice is to add sand till the mortar will just leave the hoe; rich mortar sticks to the hoe.

The common practice in the East is to make two

kinds of mortar, a face mortar, and a rough mortar for backing up (that is, for brick work). The face mortar is made of bar sand, about three to one for spread work and about two to one for buttered work. The rough mortar is made of bank sand, quite often, from the excavation, and is made as poor as possible. Of course, this is only for cheap work. Sand is usually screened on a ¼-in. screen, and for all ordinary work this will be fine enough, but for work requiring tight joints it should be re-screened on an ⅛-in. mesh screen, and for stock brick it should be still finer. Mortar for stock brick is made of screened lime putty and marble dust, or fine white sand in proportions of one of lime to one of sand. In making mortar for the large, rough joint, a somewhat different formula should be used. It is almost impossible to make a 1-in. joint with ordinary mortar. To make mortar of this kind, grit should be used.

Grit is that part of gravel or crushed stone which will not pass through a ⅛-in. mesh screen and may be almost any size, although ½-in. is about the coarsest that is ever used. The size of the grit should be about one-half the size of the joint. A formula that has been recommended by manufacturers of tapestry brick is as follows: Grit, 2 parts; coarse sand, 5 parts; cement, 1 part; lime putty, ½ part. In making mortar for heavy joints where grit is used, the proportions should always be definite; by that I mean, you should not take for granted that the coarse sand you are using has enough grit in it. It should be screened and the right amount of grit added to the mortar. In all cement-lime and cement mortar the different materials should be accurately proportioned by means of measuring boxes, and not mixed by guesswork. Lime mortar may be gaged quite accurately without use of measuring box.

In making colored mortar great care should be taken to see that different batches are mixed exactly alike, or it will show different shades in the wall. It is hard to state just the amount of mortar color that should be used in order to give a desired color, as mortar colors are not all of the same quality. Much better results can be obtained with paste colors than with those in powder form. Never mix mortar color with hot lime; it should always be cold, as hot lime fades the color. The best results in lime mortar are obtained by mixing the color paste with the sand and then the lime putty. Nearly all builders have trouble with mortar colors, as they fade so easily. It has been my experience that a brown mortar is far better for red brick than red. The red always fades; a little lampblack in red color helps it a lot. Black color fades to a sort of blue color. The best result with black color is obtained by laying up the wall with ordinary mortar, raking it out, and tuck pointing it with black mortar. Use plenty of color in this mortar. I have got good results with black color by using one-eighth as much color as mortar, but this makes it expensive.

Mortar for stone is practically the same as for brick, with the exception that it is mixed much stiffer. For rough stone work the sand is not screened finer than ¼ in. Mortar for ashlar requires sand that has been screened on at least a No. 6 sieve. Portland cement cannot be used very well in laying limestone or sandstone ashlar, as it stains the stone. White Portland, Puzzolan, Lafarges and other non-staining cements are used for this purpose. Limestone ashlar should be plastered up in the back before it is backed up with stone or brick to keep cement from staining stone. Colored mortar in stone work is always tuck pointed.

Mortar for laying hollow tile should be strong and plastic, so it will stick to the tile. A cement mortar with considerable lime works best. For laying cement blocks a waterproof mortar is often necessary. This requires a rich cement mortar, gaged with lime to make it work smoothly. Use good clean sand, fresh cement, fresh lime and clean water. Mix thoroughly, and be sure your proportions suit the kind of work you expect to do. The table given herewith will serve as a guide in making mortar for almost any purpose.

Kind of Mortar	Use of Mortar	Portland Cement	Lime	Grit	Marble Dust	Sand. Size of Sieve ¼"	Sand. Size of Sieve ⅛"	Sand. Size of Sieve 10"	Mortar Color Red	Mortar Color Brown	Mortar Color 5 Black	Mortar Color Yellow	Notes on Table
Lime Mortar for Brickwork	Spread Work Face		1			3			⅓	1/7	⅓	1/7	3
	" " Rough		1			4							
	Buttered Work		1				½		⅓	1/7	⅓	1/7	3
	Stock Brick		1		1			1	⅓	1/7	⅓	1/7	1-3
Stonework	Rubble		1			4							
Cement Mortar for Brickwork	Waterproof Work	1				2							
	" "	1				½							
	Face Work	1				3							
	Backing Up	1				4							
Stonework	Face Work	1					3		⅓	1/7	⅓	1/7	3
	Backing Up	1				4							
Cement-lime Mortar for Brickwork Stonework Hollow-tile or Concrete Blocks	Waterproof Work	1	½				2						
	" "	1	1				3						
	These mixtures are used wherever good strong mortar is required. The strength varies with the amount of cement used	1	1/10				3						
		1	¼				4						
		1	½				5						
		1	1				6						
		½	½				6						
		½	1				5						
		1/10	1				4						
Heavy Joints for Brickwork	Light Gray Mortar	1	½	2		5							
	Dark " "	1	½	2		5					1/6	1/12	4
	Cream " "	1	½	2		5						1/6	4
	Dark Brown "	1	½	2		5			⅓	1/20	⅓		4
Pointing Mortar	Brickwork	1					3						
	Stonework	1					3						
Non-staining Mortar for Stone		1					3						2
" " Cement " " Lafarge's													

Notes on Table:
1 - Either fine sand or marble dust may be used.
2 - White Portland Cement.
3 - To make red mortar use just red color. The same with other colors. Only use one color.
4 - Use all the colors given in these.
4 - These proportions are recommended by the manufacturers of Tapestry Brick for thier brick.
5 - The proportions given under black are for Germantown lampblack.

Table to Serve as a Guide in Making Mortar

Mammoth Warehouse for Los Angeles

Work on one of the most ambitious warehouse plans ever undertaken on the Pacific Coast is about to be commenced by the Los Angeles Union Terminal Company. The projected buildings, which will be practically one structure, will cover most of a 32-acre tract, and a very elaborate system of spur tracks and subsidiary transportation devices has been planned in conjunction with the project. The work of demolishing the buildings which now occupy the ground has just been started. There are eighty-four buildings to be removed, including a brick warehouse, a church, several hotels and apartments, and a number of dwellings.

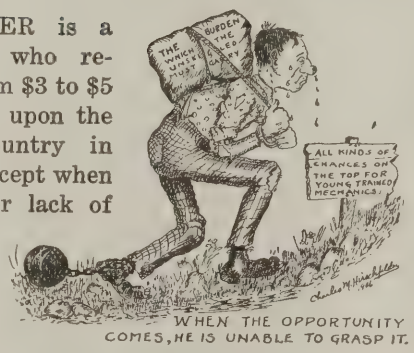


Rise from Carpenter to Contractor*

Some Timely Comments on a Phase of the Building Business Which Will Appeal to Many

By George E. Walsh

A CARPENTER is a mechanic who receives from $3 to $5 a day, depending upon the part of the country in which he lives, except when he is laid off for lack of work, and then he gets nothing, while the cost of living goes on as before. Why be a carpenter when so many other opportunities offer fame and fortune?



A building contractor is a man who may or may not have been a carpenter, yet he is a man who understands building methods from the foundation up, and who gets anywhere from a thousand or two a year to twenty times two thousand. Then why not be a contractor, and let carpentry go to the smaller man?

There is no short and easy road to success in any line. If so we'd all be at the top, and there'd be no one to do the drudgery of the world in the lower positions. All things must have a beginning, and if one is not willing to begin at the foot of the ladder the chances are that when the opportunity comes he is unable to grasp it.

In years gone by boys were apprenticed to trades, and there was no higher or nobler calling than that of a mechanic. He was always sure of a good living, with a little over. But in recent years there has grown up a tendency to shun the skilled trades. Boys are trained for the law, medicine, ministry or business, and the mechanic's trade is growing less and less attractive. The cry is that there are not enough skilled men to do the world's work thoroughly, and as a result a lot of half-trained mechanics are crowding the field.

Now carpentry is one of the oldest and noblest professions. The boy trained for it need not be ashamed of his position in the world. But what opportunities present themselves to him? In this age of progress and great fortunes one does not want to be limited to $3 or $5 a day. If there is no further inducement, the reason is plain why so few take to the skilled trades.

That is the crux of the whole question. Has the boy who chooses carpentry as his life work an opportunity to rise to a position of wealth and influence? There are not wanting many carpenters who will answer this question in the negative, and many others who will smile and say: "It all depends."

Recently I had a long talk with one of the biggest builders of the country. Annually his firm contracts for and puts up buildings worth twenty million dollars, and his profits are so large that it would take a pretty smart lawyer or doctor to make half as much an income.

Yet this man began life as an humble carpenter. He learned the trade, and worked at $1.50 a day, then $2.50, and finally reached $5.



*Cartoons by Chas. M. Hirschfelder.

He was married when he was in the latter class, but he had saved up $500, and had been studying and learning all the time. He had decided that if he always worked for others he would never get any higher. So he concluded to branch out for himself.

In his small town a dozen buildings were erected in the course of a year. He decided that he would like to build some of these. One day he made a bid for one of the smallest of the new houses going up, costing $2,000 in all. It was a modest structure, but the man had figured on it carefully. He was contractor and builder all in one. With the exception of employing a fellow-carpenter to assist in some minor points he did the whole thing. He put more time and careful attention into it than most builders, and as a result he finished a good job and cut down his profits so that he cleared less than $150. He worked three months at it, and cleared less than he could have made if he had stuck to his job at working for others.



OFTEN HE FIGURED FAR INTO THE MIDDLE OF THE NIGHT.

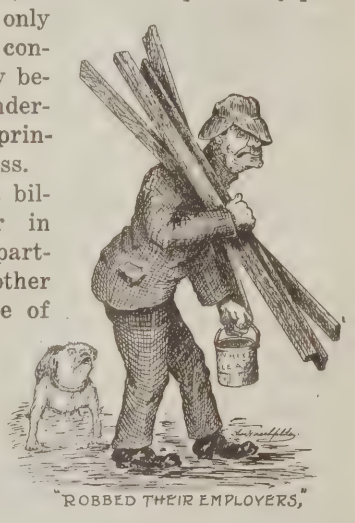
But the house stood as an advertisement for him. It was so well built that he got the reputation of building well. So when he put in a bid for another house he got the contract, although his bid was for a few dollars higher than his competitor. The contract was awarded to him because of the merits of his first job. Good workmanship proved its own reward. The second house netted him a fair profit, but the work was performed with equal skill. Before this was finished he had the contract signed for a third, and had to employ two carpenters to help him. Then a fourth came to him, and he added three more men to his working force.

By this time he decided to go into the building and contracting business, and he spent his nights poring over blue prints, books and specifications. Often he figured far into the middle of the night, and then verified his conclusions the next day when his mind was clearer. Within five years he was the leading builder of his town, and then, wishing to conquer more fields, he cast around for work in neighboring towns.

The same systematic business methods, and close attention to careful work, were given to these outside bids, and when he got a building to put up in a new town he made it a monument to his reputation. One good building, he reasoned, was worth more than columns of advertising. In time his business grew so extensive that he had to have several offices. Scores of men were working under him. From the small towns he reached out to the city, and in time mastered the problems there. To-day his business extends to half a dozen cities, and he employs nearly 500 men in one capacity and another.


THEY DRIFTED

This story of one man's success is merely typical of many others. Out of a list of 500 builders and contractors, 420 started life as carpenters. They learned their trade at the bench, mastered it in every detail, and then advanced step by step to building and contracting. Out of 50 failures last year of contractors and builders, 40 had never learned the carpenter's trade. They drifted into the business through other avenues. Not understanding the building trade from the foundation up, they were at the mercy of unscrupulous employees. The latter skimped their work, robbed their employers, and covered up artfully poor work that an expert only could detect. The contractors failed largely because they did not understand the foundation principles of their business.


"ROBBED THEIR EMPLOYERS."

We spend nearly a billion dollars a year in houses, stores, apartments, hotels and other structures. It is one of the biggest and most progressive businesses of the country, and instead of declining it must continue to increase with the growth of the country. In the single city of New York housing facilities must be provided annually for an increased population of about 200,000. For the whole country there must be houses and buildings erected to accommodate a million or more. Who are to build these structures?

The opportunities are almost unlimited. New men must constantly come forward to carry on the work. A certain amount of capital is required to enter the building business, but not more than a good carpenter can save up in the course of a few years. To the builder credit is worth more than capital. In his home town it is a simple matter for the man who always pays his bills to get credit for lumber and building materials.

Here is an illustration of how one carpenter got his first start through credit. He had saved up $200. Then one day he got the opportunity to build a small structure costing $2,500, payments to be made in three equal installments. He went to the local dealer in lumber and building materials and showed him the contract. He promised to pay $100 down, and the balance as his payments came due. The dealer instead of turning him down was only too glad to get his trade, and the building materials were delivered as fast as needed. At one time the

carpenter was nearly $1,000 in debt to the dealer, but he made good, paying off the bills as his own payments were made. There is no business where a local carpenter can get credit so easily as when he shows a contract for putting up a house on the time payment. Credit is easily established—if one has the reputation for honesty.

The opportunities in the building and contracting trade are better to-day than ever, and there is no monopoly of the business. It is true that in the big cities companies are organizing to do this work so that on the big jobs the poor man has less chance. But the real opportunities come in the small jobs. In every town and hamlet of the country these opportunities are offered. If one can make good on them he has the wider and greater opportunity that comes from growth and expansion.

Instead of looking down upon and despising the humble trade of the carpenter we might well view it with envious eyes. The skilled carpenter with a gift for organization and system may within a few days become our master and superior. He has the opportunity of making a fortune that is denied nine-tenths of the professional and business men who stick to the old ways. But the man should begin, as a boy, at the bottom, and learn the ropes all the way up. The more thorough the training and experience the better the opportunity of succeeding.

The Need for Better Building Construction

Among the many important matters considered at the twentieth annual meeting of the National Fire Protection Association recently held in Chicago, was that of the need for better building construction, due to the many disastrous fires of the past few months which emphasize the necessity of avoiding the use of combustible materials in the exterior of buildings. The association heartily commended the growing movement for city planning as likely to produce better conditions as to building heights and congested areas, and to provide the open spaces of broad avenues which, in addition to their human and aesthetic values, are excellent checks to sweeping fires.

In its warfare against the needless sacrifice of human lives and property by fire the association advocated ten measures, including the following:

The adoption by municipalities of the Standard Building Code of the National Board of Fire Underwriters to the end that fire resistive building construction may be encouraged, the use of inflammable roof coverings prohibited, adequate exit facilities from buildings assured, and interiors so designed and fire-stopped as to make easy the extinguishment of fires therein.

The adoption by all states of minimum building requirements for the protection of State and County hospitals, asylums and similar institutions outside city limits and of small communities in which the establishment and enforcement of a building code is impracticable.

The adoption of the Association's suggested ordinance providing for the systematic inspection of all buildings by city fire marshals or local firemen to insure the vigorous enforcement of rules for cleanliness, good housekeeping, and the maintenance of safe and unobstructed exits, fire-fighting apparatus and other protective devices.

The wider general use of the automatic sprinkler as a fire extinguishing agent and life saver and the more general adoption of the fire division wall as an important life saving exit facility.

A careful study of the technical surveys of cities made by the engineers of the Committee on Fire Prevention of the National Board of Fire Underwriters covering the items of water supplies, their adequacy and reliability, fire department efficiency, fire alarm systems and conflagration hazards: and of the possibility of co-operation among neighboring cities through mutual aid and the standardization of hose couplings.

The education of children and the public generally in careful habits regarding the use of fire.

Active Building Season Predicted

"The building business in Indianapolis is recovering from the depression of the last four years, and the outlook for the spring and summer building is encouraging," is the opinion of John Hauck, secretary of the Building Contractors' Association and the Builders' Exchange of Indianapolis, Ind. "Materials, especially all kinds of metals, are high in price because of their demand by war munition factories. Lumber is no higher, however, than it was four years ago. It is not to be anticipated, however, that construction work will reach its highest figures until conditions are normal again."

Modern Open Stair Tenements

Plans are under way looking to the completion of a New York tenement house which will embody the novel feature of the open stairway. As the halls in the majority of tenements are usually dark and unwholesome, the architects have arranged each of the six units of the proposed structure with a large central court as well as street courts on either side of each unit. The stairway, protected from the elements, but open to air and sunshine, is located in this central court and leads to the street through a broad central passage, unobstructed by gate or door. Each tenant will be perfectly isolated after stepping over the threshold of his apartment from the stair court recess, the space usually devoted to stairs and halls being utilized to permit of larger rooms. The plans, which call for an estimated outlay of $1,000,000, have been prepared by H. A. Smith and W. P. Miller, associated architects, and provide for six six-story units, each with a frontage of 108 ft. The combined units cover an area of about two acres, and provide accommodations for 648 families lodged in suites of two, three and four rooms each with bath. The buildings will be erected in 146th Street, between Seventh and Eighth avenues, and will extend through to 147th Street.

New Reinforced Concrete Factory Buildings

A group of reinforced concrete factory buildings with warehouse, garage, etc., is about being erected at Flushing, N. Y., at an estimated cost of $500,000. The factory buildings will consist of a central craneway 311 ft. long with six two-story buildings at right angles to it and each covering an area of 60 x 150 ft. in size. The architect is Eugene Schoen, 37 Fulton Street, Jamaica, N. Y., and the contract has been awarded to Rheinstein & Haas.

The forty-eighth anniversary exercises of the Hampton Normal & Agricultural Institute, Hampton, Va., were held in the gymnasium on Friday, May 12, with appropriate ceremonies.

Some Things to Know About Chimneys

Results of Personal Observations by a "Chimney Doctor" Who Has Had 23 Years' Experience

By G. D. Crain, Jr.



FROM a construction angle the chimney offers no difficulties to the builder. As a structural proposition, a hollow column of brick, with a terra cotta lining, either tied to a wall or free, is an open book to him. He knows that the whole business of chimney construction has been reduced to an exact science. Any handbook will give him the particular formula he wants to guide him in getting the dimensions. As a technical proposition the chimney has been given all the attention coming to it by noted authorities, from Rumford down. But a chimney is not a chimney unless it behaves itself and there are numbers of practical things to know about chimneys not found in books.

Hints by the "Chimney Doctor"

A "chimney doctor" who has spent twenty-three busy years correcting evils of chimney and fireplace construction in his Middle Western home, gave these hints to the writer and he is now passing them on. They are the results of personal experience. Generally, this "chimney doctor" says chimneys built according to standard dimensions and for average uses work satisfactorily. Stock sizes of flue linings and standardization of stove, furnace and other chimney connections contribute to this efficiency. Much of the faulty construction is to be charged to architects long on theory and short on practice. Builders, also, the doctor testifies, in trying to save material and time fall into errors which make trouble afterward and hurt their reputations.

The open fireplace chimney connection is most sinned against, says this doctor, who has treated many cases of throat trouble. Chimneys which serve stoves, furnaces, etc., don't make much trouble, even though they may be stealing a lot of the heat that ought to be radiating, but "the smoke goes up the chimney just the same" and that is the main thing. Whatever may be the builder's own views on the subject, the fact remains that the open fireplace is becoming more and more popular and the majority of new houses have them. Rooms in which they are placed become centers of family life and it is, therefore, highly important that they be well and correctly built.

The Flue Linings

One of the doctor's practical tips is that the dimensions by which flue linings are bought do not describe the area of the flue. For instance, the standard 9 x 9 flue lining does not mean a 9 x 9 flue. It means a flue as much less than that as the area of a cross-section of the flue. In terra cotta such a flue is 7 x 7 in., not 9 x 9, because the thickness of the flue lining has to be taken off. Terra cotta linings are 1 in. thick; thus 32 sq. in. have to come out of the apparent 81 sq. in. of flue and you have left a flue of 7 x 7, or 49 sq. in. Quite a difference! This means that where an unlined chimney, capable of taking a 9 x 9 flue and sufficiently capacious when unlined, to carry off the smoke from an open fireplace when lined with terra cotta, becomes altogether inadequate to do the work demanded of it.

Chimneys with 9 x 9 Flues

A great deal of this doctor's work results from the fact that builders, as they did in years gone by, build their chimneys with 9 x 9 flues. Now, however, the city's building code calls for flue linings. So these builders put 9 x 9 flues in their 9 x 9 chimneys and they won't do the work required. Then the house owner sends for the chimney surgeon, who has to reduce the throat to correspond to the capacity of the chimney and a big fire in a big fireplace burns with a feeble flicker and little warmth. Pretty soon there are a lot of people saying that "they don't know how to build fireplaces nowadays," and the builder gets blamed.

For all fireplaces with openings up to 32 in., the doctor says, flue linings of 9 x 13 in. should be used. This will insure sufficient draft to carry the smoke and gases up the chimney. If a round lining should be used the inside area should be approximately the same in square inches. Above 30 or 32 in., referring to fireplace openings, he says, the 13 x 13-in. terra cotta linings should be used for ordinary work. This is for fireplaces with openings up to 42 in. For undertakings with larger openings, the builder generally would be following architect's specifications, and the responsibility will rest primarily on the architect, though it would be well for the builder to check these plans because he will have to bear as much of the onus for a fireplace that "smokes" as will the architect.

Position of Rectangular Flue Lining

Another wrinkle is also suggested by the doctor, who says that when a rectangular flue lining, greater in one dimension than in another, is used, the wide side should lie against the chimney breast. For instance, if the lining were to be 9 x 13 in., it should lie with the 13-in. side parallel with the greater width of the mantel and the 9-in. dimension should extend across the wall in which the chimney is built. The principal reason for this disposition of the flue is the effect it will have on the appearance of the

flame in the open fireplace. If the 9-in. width should parallel the firebox, the flame would be contracted as it rose above the fuel; while if the extended opening were provided the flame would spread as it rose and look more as a flame ought to look.

"Make the opening from the fireplace correspond in square inches to the opening at the top of the chimney," is the way the expert referred to states the proposition in everyday figures. That is what he does when he doctors unsuccessful fireplaces. It is a matter of correct adjustment of the firebacks and the shelves at the bottom of the flues, of dampers, sidewalls, etc. Often he finds grates with mouths much too extended. Result: smoky fireplaces and disappointed owners. Another frequent evil this doctor also finds is flues unduly contracted inside the walls, as in cases where these flues are being conducted from fireplaces on both sides of thin walls to flues which rise side by side.

Flues Unduly Contracted

One typical job of this kind occurred in a new house in which were two fireplaces, on opposite sides of a 12-in. wall, both of which smoked when fires were built in them. Both were apparently well constructed; the chimney tops were as they should have been. The trouble was internal. "I took one mantel away; tore out one fireplace and found what I expected," said the expert. "In order to save brick and space in both rooms the architect and builder had tried to crowd both flues into the same 12-in. wall. At the tops of each of the firebacks the throats of the chimneys both sloped backwards necessarily, but before they could be deflected laterally to the line of their respective flues they clashed. At these points, where the throats had been rectangular, they were divided by one row of brick into triangular passages, with the result that each flue was reduced to one-half of the dimensions it should have had. Of course they smoked."

So the expert built an arch from the floor level to the tops of the firebacks. Then one thickness of firebrick was set up for the back of each grate and the sloping firebacks were both set on this single course. Above, where the flues contested for space, they were divided by a single course of brick set edgewise—making a partition 2 in. thick instead of 4, as had been the case, while the gain in condensing the wall between the fireplaces enabled the builder to overcome the lateral deflection in a degree. This cost money, as the expert observed, and was at best flimsy construction, though it gave the house owner fireplaces that would work. If the builder had refused to let himself be persuaded to do what he knew could not be done, he would have saved himself and the architect a black eye apiece.

Elaborate Fireplace With Small Flue

This same expert spoke of numbers of similar instances, referring to an elaborate fireplace in a fine big house, with a costly mantel of Caen stone, wonderfully carved, etc. The fireplace opening is 42 in. and the architect has given that fireplace only a 9 x 9 in. flue which, besides being utterly inadequate, makes two sharp turns in a short space, in order to give the architect what he wanted on the other side of the wall. One thing is sure about this fireplace, the expert declared. The first time the owners of this mansion build any considerable fire in it they will have a royal big smoke out. Then they will have to tear out the whole side of the room and reconstruct or put in two or three little gas logs and make them answer for their wood fire.

Another thing for the builder to consider is that enough air must be provided to make the draft. The tendency of modern building is to weather strip until not a breath of air can enter. This is excellent inasmuch as it enables the occupants to control means of ventilation, but unless these means are provided, look out for smoky fireplaces. Without it there is no column of cold air to boost the warm air in the chimney. When, as is sometimes the case, it is necessary for the householder to let a certain window down 1 in. from the top in order to keep a fireplace going satisfactorily, either the architect or the builder has slipped up.

Like man, who cannot live to himself alone, chimneys cannot draw to themselves alone. They must be considered in relation to their neighbors. Every builder knows of those which suck as well as those which have too much draft. Their tops should, generally speaking, be on the same level as the tops of those which surround them, or they should be equipped with wind caps, or both. And there are various good things to know about chimneys and fireplaces as to fire prevention. That this is an item worthy of careful study is proven by the large number of fires which are charged to defective flues. The hearth-box is another source of trouble.

"The fireplace for the coal fire, which is elevated in a grate, is safe with a shallower box than the wood-burning fireplace," the expert points out. "This is because the wood fire is burned right on the floor of the fireplace while the coal fire burns on an elevation and there is a non-conducting pan of ashes between it and the floor."

The Shallow Fire Box

And when the chimney builder lets the general contractor dictate a shallow fire box that the builder knows is not safe, he can be sure that the insurance underwriters and the building inspectors will "burn him up" when they investigate the cause of the fire that will be inevitable. When the investigators say to the builder: "You certainly knew that that fireplace was not safe" there is no answer for the builder to make, and he gets another black eye. This is not to say that the builder is under any obligations to censor the specifications of the architect or ride around on a high horse and assert his knowledge about chimneys whenever he does a piece of work. But it often will be to his interest to remember that he is going to have to bear a lot of the criticism that a poorly built chimney or fireplace draws, because he did the work and should have known better.

These suggestions are only the beginning of what the builder can find out for himself about chimneys and fireplaces. No builder can know too much about them and text books are available on all sides. Modern building codes often show an excess of caution, but there will often be builders of houses who want that degree of caution taken in their work. The more the builder knows about chimneys the greater will his field be extended.

Two Frame Cottages of Moderate Cost

Plans of Workingmen's Houses with Some Details of Construction—Cost $2,300 and $2,200 Respectively

COTTAGES so arranged as to meet the requirements of workingmen as well as families in moderate circumstances are especially interesting, combining as they often do a compact grouping of rooms with economy of construction. The two examples which we present herewith are intended to be used as homes of this nature, the reader being able to form an excellent idea of their appearance in completed state from the halftone engravings upon this page.

The cottage shown in Fig. 1 is two stories in height, of balloon frame construction and having parlor, living room and kitchen on the first floor, with three bedrooms and bath on the second floor.



Fig. 1—Frame House Costing About $2,300



Fig. 2—Frame House Costing About $2,200

Two Frame Cottages of Moderate Cost—Architect Genaah Jordan, Coopersburg, Pa.

The outside frame is covered with No. 3 North Carolina flooring, the best of the material being sorted out and used for the floors of the house. Over the sheathing boards is placed German siding of white pine ⅞ in. thick. The roof is of dark blue slate. The gables are shingled and before laying the shingles were stained terra cotta color. The house is painted a light straw color, which contrasts with white trimmings and green blinds.

The inside finish is of yellow pine, the parlor, living room and hall being stained a dark oak. The bedrooms are finished in light oak and the kitchen has a natural finish. The stairway is a closed string with a 6 x 6-in. starting newel and 4 x 4-in. hanging newels. The balusters are 1⅛ in. square.

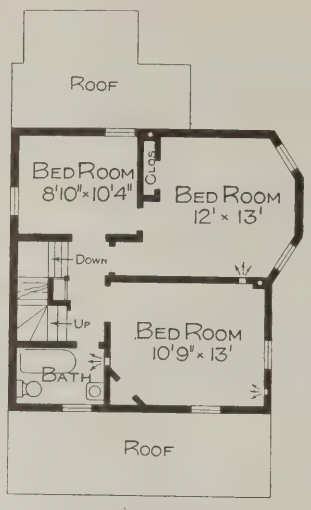
The foundation walls are built of local stone and pointed both inside and out. The cellar floor is of cement concrete, where so indicated on the foundation plan.

The house is heated by means of hot-air furnace. The range has a place just off the kitchen in what might be regarded as an alcove lighted by a window, but the space is provided with doors so that it may be shut off from the kitchen during warm weather. The hot-water boiler is located in the same place by the side of the range.

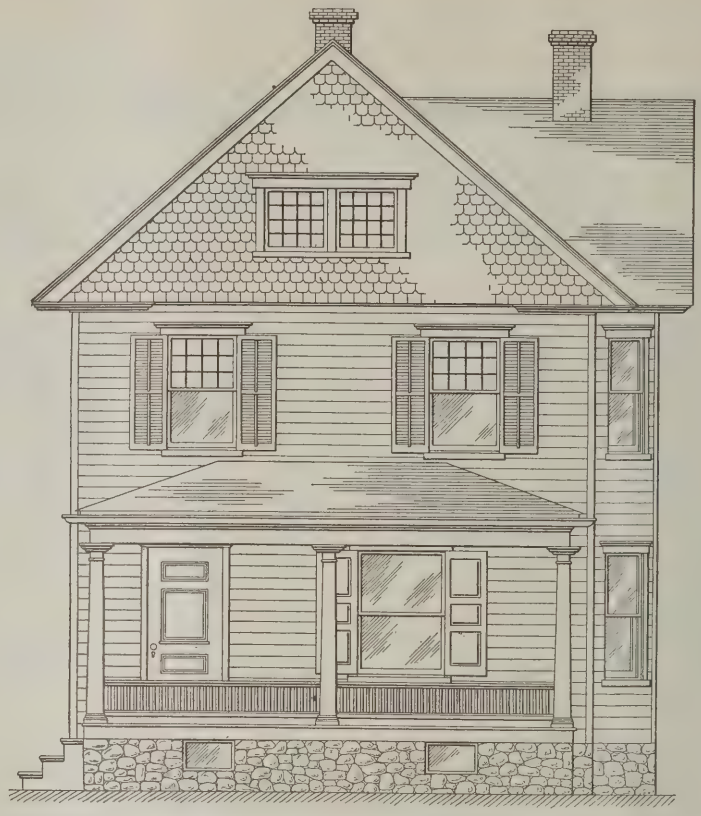
The bathroom has a lavatory and medicine cabinet. Soil and vent pipes were put in to save unnecessary expense later on, although bathtub and closet were not installed at the time the house was built. The sink in the kitchen has hot and cold water connections with waste pipe leading to outside drainage pipe. There are also hot and cold-water connections in the cellar.

The plastering is regular three-coat work, the finish coat being a hard white, of plaster of paris, lime putty and pewter sand.

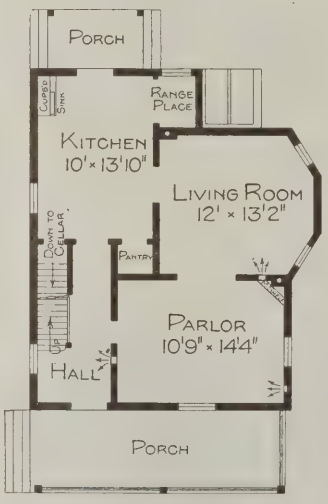
The house was built three years ago at an actual cost of $2,260, in which is included no contractor's profit. Most of the labor was done by the day or by subcontract.



Second Floor Plan

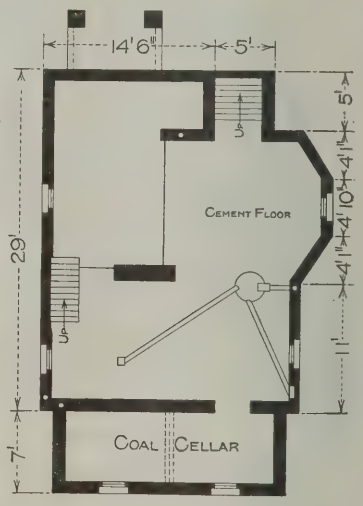


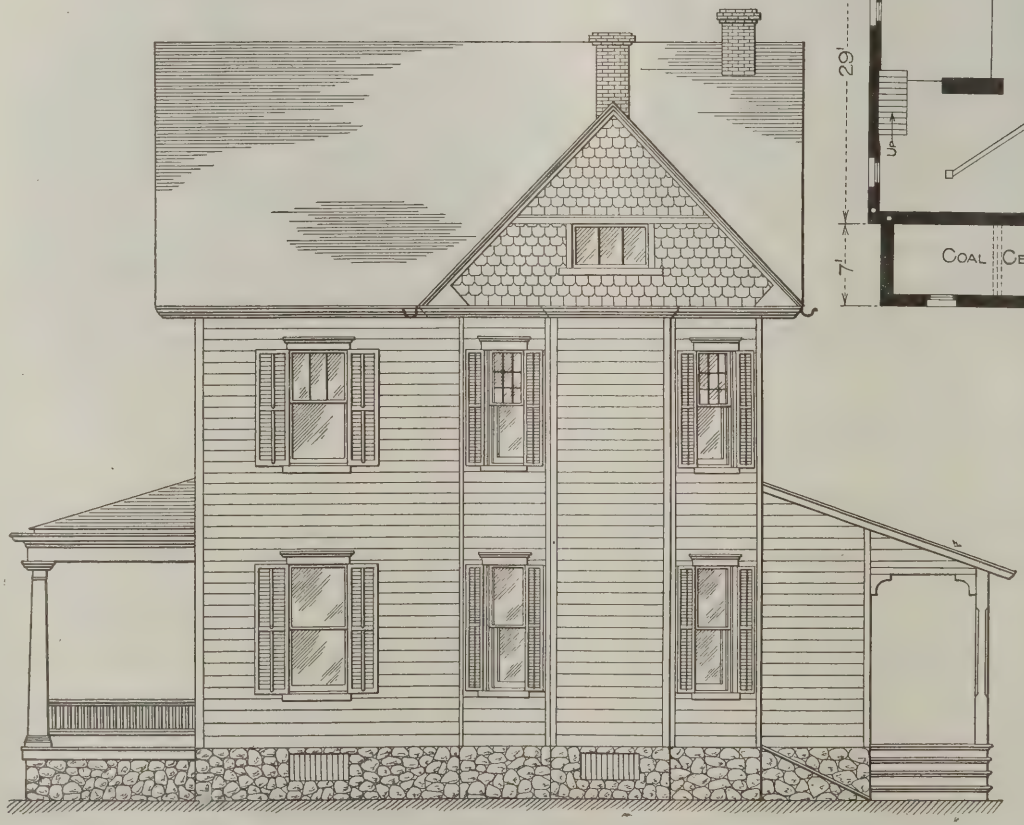
Front Elevation—Scale ⅛ In. to the Foot



First Floor Plan

Foundation Plan—
Scale 1/16 In. to
the Foot



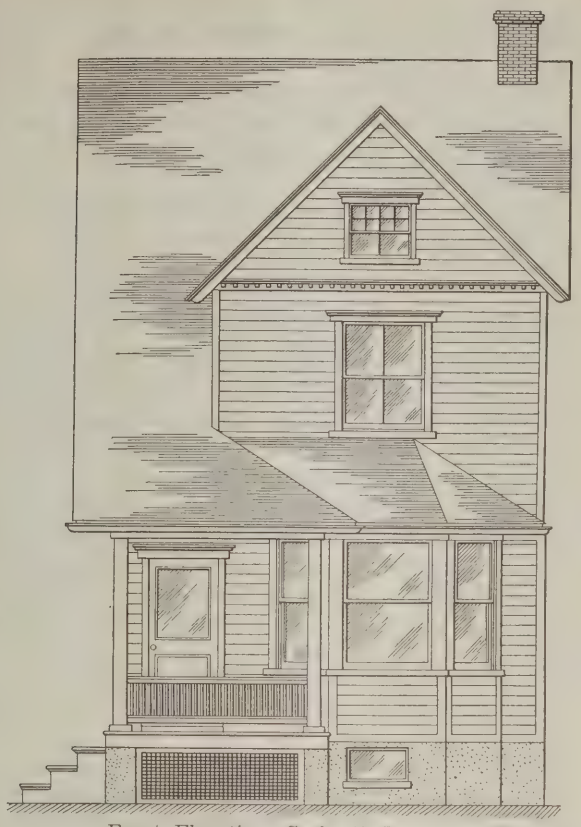


Side (Right) Elevation—Scale ⅛ In. to the Foot



Base—
Scale 3 In.
to the
Foot

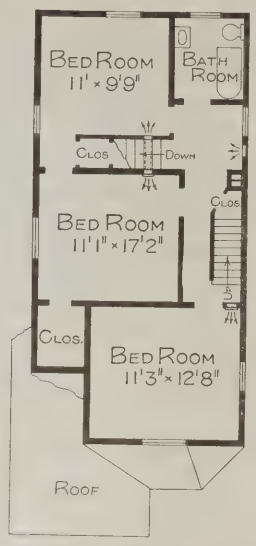
Plans, Elevations and Detail of Moderate Cost Frame House Shown in Fig. 1.



Front Elevation—Scale ⅛ In. to the Foot

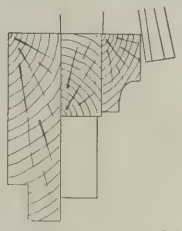


First Floor Plan



Second Floor Plan

Scale 1/16 In. to the Foot



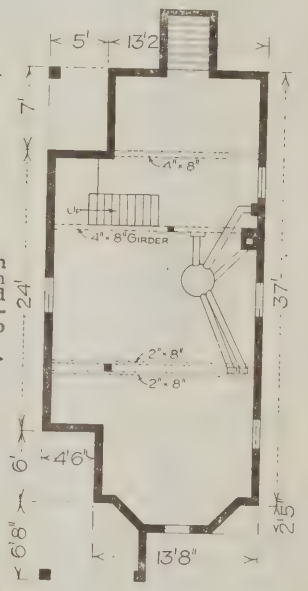
Detail of Belt Course of Gable Front

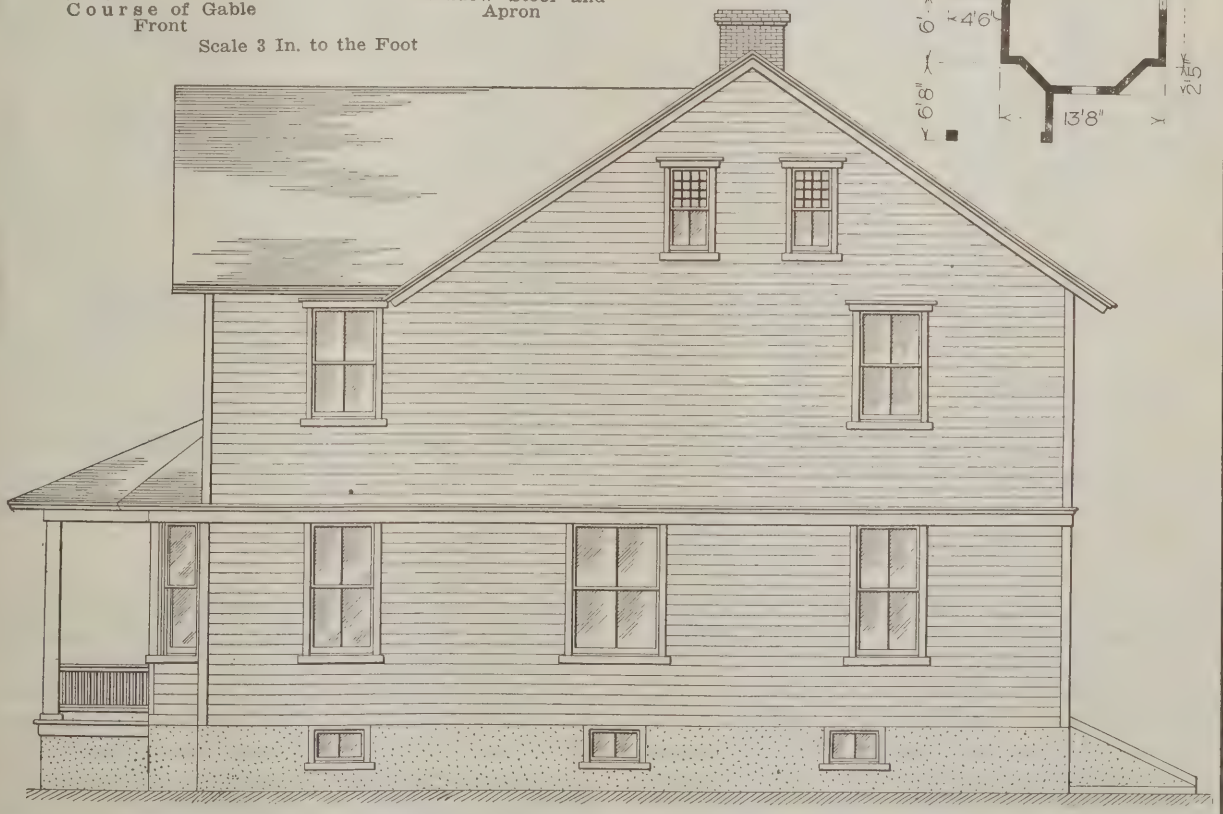


Window Stool and Apron

Scale 3 In. to the Foot

Foundation Plan Showing Position of Furnace and Run of Pipes — Scale 1/16 In. to the Foot





Side (Right) Elevation of House Shown in Fig. 2

Plans, Elevations and Miscellaneous Constructive Details of House Shown in Fig. 2

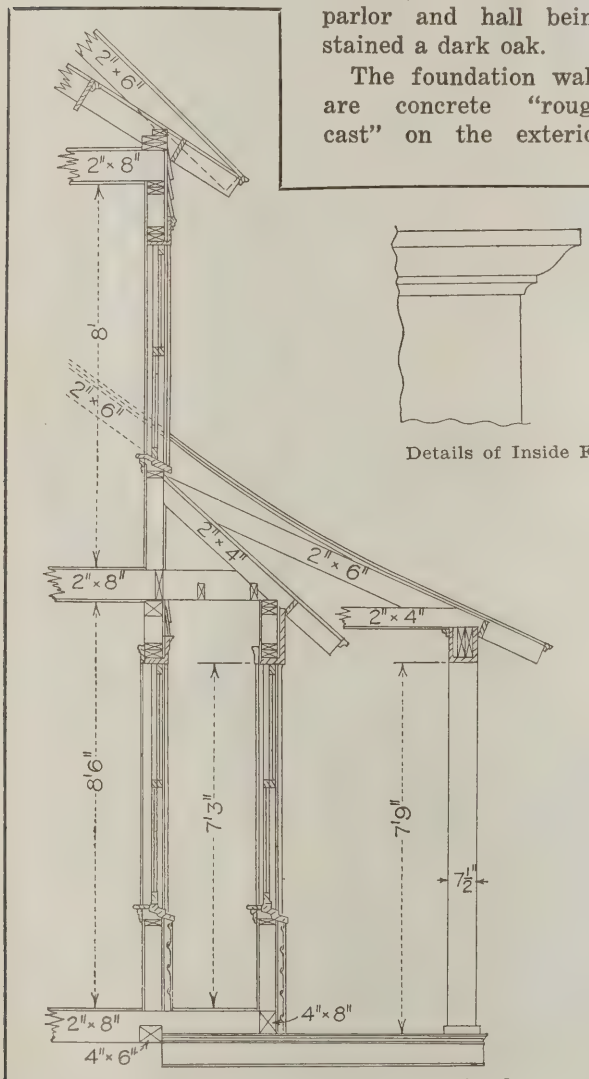
The cottage shown in Fig. 2 is also a two-story and attic affair of balloon frame construction, the outside frame being sheathed with 1-in. hemlock boards over which is placed a layer of heavy tar felt. The first story has an outside covering of ⅞-in. German siding, while the second is covered with ½ x 6-in. spruce siding, there being a belt course between the two styles of siding, as shown in the picture on another page. The roof is of shingles.

The exterior of the first story is painted a pearl gray and the second story an ivory tint, while the trimmings are snuff brown.

The plastering is three-coat work, the same as in the cottage shown in Fig. 1 and the general construction of the two houses is much the same.

In the house shown in Fig. 2 the inside finish is cypress, the dining room, parlor and hall being stained a dark oak.

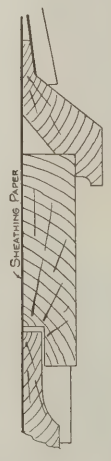
The foundation walls are concrete "rough cast" on the exterior



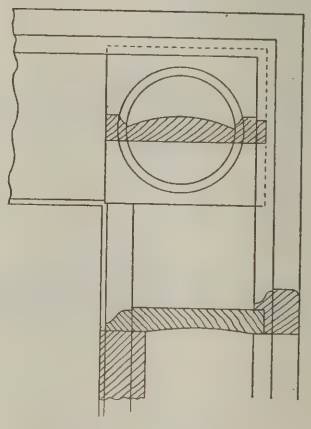
Detail of Framing of House Shown in Fig. 2—Scale ¼ In. to the Foot



Details of Inside Finish of House Shown in Fig. 1—Scale 3 In. to the Foot



Second Floor Belt Course



Details of Inside Finish of House in Fig. 2

Scale 3 In. to the Foot

Miscellaneous Constructive Details of Two Frame Cottages of Moderate Cost

while the interior is plastered and whitewashed.

The shape of the house is somewhat different from the other, being much deeper than it is wide and thus calling for a somewhat different arrangement of rooms.

The house is heated by hot-air furnace. The sink in the kitchen has hot and cold-water connections and there are hot and cold-water spigots in the cellar.

The bathroom is provided with bathtub and lavatory, but at the time the house was built the closet had not been installed, although soil pipe and vent were put in ready for future connection.

The house was built two years ago at an actual cost of $2,144, the labor being done by the day or by subcontract. No contractor's profit is included in these figures.

The two houses here shown were designed by Architect Genaah Jordan, Coopersburg, Pa.

A Move for Better Building Construction

Through a co-operative arrangement on lumber specifications and the branding of timber, the Illinois Society of Architects and the manufacturers of Southern pine lumber have taken an important step for the improvement of the quality of future buildings in Chicago and the State of Illinois. The arrangement is of particular importance to Chicago as it is in the metropolitan district that strict specifications for building are most necessary. It is likely, however, that the Illinois action will be taken as a national standard for building codes, and mark a new era in the forcing of proper construction of business buildings, as well as residences.

The nature of the specifications is such that when the architect wants a specific quality of lumber for a building, requiring, for instance, maximum durability and strength, he will specify the use of timber of a special grade, and the manufacturer's brand on this timber will guarantee to the architect that he is giving his client an adequate quality of timber.

The specifications are of interest to owners of buildings, for they will prevent the substitution of inferior lumber.

The form of specifications adopted by the Illinois Society of Architects follows:

For Southern Yellow Pine Structural Timbers

(1) When both maximum durability and strength are required.

Longleaf southern yellow pine of "select structural material" grade in accordance with the definition of "Dense Southern Yellow Pine" as adopted by the American Society for Testing Materials (August, 1915), and the Southern Pine Association ("Density Rule" Book, March 15, 1916). To be dressed to standard sizes conforming to the rules of the Southern Pine Association and branded in accordance with the official requirements of that association.

(2) When strength is required without special reference to durability.

Southern yellow pine of "select structural material" grade as defined in section (1) above. To be dressed to standard sizes conforming to the rules of the Southern Pine Association and branded in accordance with the official requirements of that association.

(3) When used without reference to durability or maximum strength.

No. 1 common southern yellow pine timbers of "dense" grade as defined in the "Timber Rule" book of the Southern Pine Association (March 15, 1916). To be dressed to standard sizes conforming to the rules of the Southern Pine Association.

(4) When used for joists, studs, etc., in ordinary or minor structures without reference to durability or maximum strength.

No. 1 common southern yellow pine, as defined in the "Timber Rule" book of the Southern Pine Association (March 15, 1916). To be dressed in standard sizes conforming to the rules of that association.

For Southern Yellow Pine Heavy Factory and Laminated Flooring

(5) When durability and maximum strength are required.

"Dense" southern yellow pine of "merchantable grade" as defined in the "Timber Rule" book of the Southern Pine Association (March 15, 1916). To be dressed to standard sizes conforming to the rules of that association and branded in accordance with the official requirements of that association.

(6) When strength is required without reference to durability.

Southern yellow pine of "No. 1 common timbers" as defined in the "Timber Rule" book of the Southern Pine Association (March 15, 1916). To be dressed to standard sizes conforming to the rules of that association.

NOTE.—In lieu of the branding of timber above specified, the contractor may, at his option, arrange to have all material furnished under this specification inspected by the inspection department of the Southern Pine Association, in which event the contractor shall furnish and deliver to the architect a certificate showing that all material delivered complies with the architect's specifications. The entire expense of said inspection must be paid by the contractor.

Reinspection

Should the architect demand that any material delivered be reinspected the said inspection shall be made by the official inspectors of the inspection bureau of the Southern Pine Association. Should 95 per cent or more of the material inspected be approved as complying with the grade specified the inspection fee shall be paid by the owner. Should 5 per cent or more of the material inspected be rejected by the said inspector as not complying with said grading rules all inspection fees shall be paid by the contractor.

A Fourteen-Story Studio Building

An improvement which is to replace several buildings in old Washington Square, New York City, is a fourteen-story apartment house designed by and for artists and the cost of which is placed at $750,000. It is located on the south side of the Square and is the most ambitious apartment house operation which has ever been planned for that old residential section. The project is of the co-operative building type, an arrangement which relieves the owners of the trouble and expense of management and leasing vacancies, and at the same time assures them a definite income.

The new house will cover a plot 70.7 ft. on Washington Square and 164 ft. on Thompson Street. The section facing the square will be devoted exclusively to studio suites for artists, while the remainder of the house facing Thompson Street will be of suites of two to four or six rooms. By the co-operative method each tenant buys his own apartment outright and he can have it planned according to his own ideas if taken before the building is completed. By the interlocking system these studio suites may be duplex or single. This duplex connecting system of living quarters as worked out by Charles W. Buckham, the architect, affords a certain flexibility to increase or decrease the apartment space according to requirements, and it is said to be the first time that such a plan has been worked out with such careful detail.

The building, although fourteen stories, will not exceed in height a total of 150 ft. It will be Gothic in its architecture and the facade will be of light face brick and terra cotta.

The Modern Apartment House

There seems to be no end to the inducements offered by owners of flat buildings to prospective tenants. An interesting folder recently issued in Chicago covering the feature of a court apartment enumerates the following advantages.

Maid service by hour or day.
Grecian café at reasonable prices.
Vacuum cleaners at your own disposal.
Extensive lawns and attractive shrubbery.
Beautiful flowers, tennis courts.
Free swimming pool with heated water, summer and winter.
Finely equipped gymnasium with free instructions in art of fencing and Swedish movements.

The following are classified as innovations:

Disappearing bed in each apartment.
Especially designed consoles. Buffets with plenty of drawer space and shelf room.
Shower baths, mosaic floor and beautiful bathroom equipment.
Steel medicine cabinets, wall safes, out-of-sight garbage receptacles.
Merchandising receiving cases, inside white enameled self-draining refrigerators.
Practical self-lighting gas ranges. Heavy, luxurious Brussels stair carpet used in harmony with the woodwork. Curtain rods and all necessary fixtures to all windows.
White enameled steel kitchen cabinets, sugar and flour receptacles and glass rolling pin; dressing mirror in closet door, electric light fixtures of the latest design.

The architecture is said to be of a new and unique design with sun parlors and private screened sleeping porches, containing apartments of 2, 3, 4, 5 and 6 rooms each. The approaches to this building are by means of beautiful courts and lanes, protected by self-locking front doors with electric openers controlled from each apartment.

New Publications

Paint and Color Mixing. By A. Seymour Jennings, 245 pages, size 5½ x 8½ in. Illustrated with 300 samples of oil- and water-paints and water colors and 1500 different color mixtures. Bound in cloth. Published by Spon & Chamberlain. Price, $2.

The popularity and practical value of this book have necessitated the publication of a fifth edition, which cannot fail to prove interesting and instructive to the builder or carpenter-contractor who does more or less painting in connection with his regular work, or who is at least interested in knowing the color possibilities of painting. Different colors and their varying tints are exhaustively illustrated, interest being enhanced by the accompanying explanations as to how they are mixed.

The new edition has been enlarged by fifty pages, and the number of plates has been increased from thirteen to seventeen. Color matching has been given more attention than formerly. Other important additions include chapters on "Straining Colors," "Putty Hard Stopping and Brush Filling," as well as "Two Hundred Standardized Colors." Although intended primarily for decorators, the attention that the book has received from paint and color manufacturers caused the author to devote considerable additional space to machinery used in paint and color mixing.

Many readers are doubtless familiar with the material contained in former editions of this work, but those who are not will be interested in learning that the headings for the old chapters cover about everything a man is likely to wish to know about paint.

Architec-tonics—The Tales of Tom Thumtack, Architect. 175 pages; size, 5 x 7 in.; 100 illustrations; bound in cloth. Published by the William T. Comstock Co. Price, $1.50.

An architect has been able to claim almost everything except a place in literature as a recognized character in fiction. The author of this little book decided to give the architect that honor, treating him with a humor sometimes sarcastic, sometimes sympathetic; but whether it be the architect, his client or the builder who bears the brunt of the author's quiet yet truthful fun-making, the humor is entertaining and at times instructive. It is worth while for a man to once in a while stand back from his work and amuse himself by realizing how funny some of his most aggravating encounters have been. Ability to see the humorous side of a disappointment tempers many a sad misfortune.

Limes and Cements—Their Nature, Manufacture and Use. By Ernest A. Doncaster. 212 pages; 21 illustrations. Published by D. Appleton & Co. Price, $1.75.

This is an elementary treatise written by an Englishman and is a scholarly compilation of articles contributed by men of many nationalities to periodicals. In this connection it is gratifying to note the list of American works drawn upon.

It should be in the hands of all architects, contractors and engineers. The language is clear, and the absence of terms understandable only to men of college training is marked. It is written for the everyday worker, and covers all the points really necessary for men to know in the daily conduct of business. Practically every question the plasterer, the average cement-worker, brick-mason and carpenter may ask is here answered. The man who likes a more scientific discussion is cared for in references to the sources from which the author drew. It is a fine example of a practical book for practical men written by a conscientious and well-trained student.

Mechanical Drafting. By Charles B. Howe. 147 pages, size 11 x 8 in. Illustrated with 166 photographic views and drawings. Bound in cloth. Published by John Wiley & Sons. Price, $1.75.

This book has been prepared with a view to supplying the needs of students. The author expresses the belief that "the chief value of a knowledge of mechanical drawing is its utility as a medium of expression." The text and illustrations have therefore been prepared along these lines. The book contains information as to the nature and uses of the instruments required in mechanical drafting; the fundamental principles of drafting and the means by which different materials and construction lines are shown; lettering; geometry of drawing; orthographic projection, etc. Attention is also given to working drawings, machine drawing, plan drawing and photographs of the house and parts constructed from given plans; conventional typographical signs; pictorial representation and sketching, etc. There is a chapter on "Blue Printing," which contains valuable information as to the methods and apparatus employed.

A Novel Architectural Undertaking

Plans and pictures of the Dominion of Versailles, intended to be the biggest architectural feature or mass in America, have been prepared by a well-known firm of architects, who aim to make an American adaptation of the French Chateau de Versailles for residential purposes with a combination of the best elements of city and country life. It will be located on Long Island, four miles beyond the boundary line of Greater New York. The site contains 180 acres, to be laid out in gardens or parks. The chateau is planned to be 1200 ft. in length. The front portions will have an average height of eight stories; rear portions will average sixteen stories, culminating in two towers each 375 ft. high.

A garage is about to be built in Augusta, Kan., covering an area of 50 x 120 ft. and constructed of brick and concrete with a front of pressed brick and plate glass. A gravel roof of the suspension type and containing a large skylight will permit of a display room said to be the largest of its kind, without posts or supports, in Kansas. Back of this room will be a shop and wash room. Architect S. G. Bond has provided plans for a building costing about $7,000, which will be erected by Schoeb & Middleton.

Current News of Builders' Exchanges

Annual Meetings and New Officers for the Ensuing Year—Banquet of the Grand Rapids Exchange

Banquet of Grand Rapids Exchange

THE members of the Builders' and Traders' Exchange of Grand Rapids, Mich., held their second annual banquet at the Livingston Hotel on the evening of May 3, when fully two hundred, including invited guests—the architects of the city—sat down to the good things which had been provided by the committee in charge of the affair. President Glendon A. Richards of the Exhange presided and Clye Ross acted as toastmaster. There were a number of speakers and the dominant tone of the addresses was efficiency in business and preparedness for it through public-school education.

The first speaker was S. Eugene Osgood, who had for his topic "The Sky Line of Grand Rapids," and the point was made that the real sky line of the city was not in skyscrapers but in the efficiency of big business that made such structures possible. He declared that the Builders' and Traders' Exchange represents the efficiency sky line of business by the new alliance in preparedness through co-operation; that the Exchange is an organization through which the standard of the sky line of business is being raised. H. W. Faraday of the Emerson Institute responded to the toast, "Fireproofing Construction and Its Relations to Efficiency." The principal address of the evening, on "Social Preparedness," was by Rev. A. W. Wishart, who pointed out that the American public school is, or should be, the basis of preparedness.

Another pleasant feature of the evening was the presentation by President Richards on behalf of the Builders' and Traders' Exchange of loving cups to S. A. Morman, George C. Schroeder and C. M. Emerson, ex-presidents of the Exchange. During the evening music was rendered by the Livingston Hotel orchestra, and there were violin solos and selections by artists from the Empress Theater.

Pawtucket Builders' and Traders' Exchange

The members of the Builders' and Traders' Exchange of Pawtucket, R. I., held their annual banquet at the To Kalon Club on the evening of Thursday, May 18, when addresses were made by prominent contractors of New England. The committee in charge of the affair consisted of Joseph F. Salisbury, Henry Vigeant and M. T. Keane.

At a recent meeting of the Exchange an agreement with the Carpenters' Union, to go into effect June 1, was ratified. Practically the same schedule that has been in force among the larger contractors during the past year will go into effect and will mean an increase for carpenters employed by the smaller contractors.

Edward A. Collings was recently elected permanent secretary of the Exchange.

Builders' Exchange of North Carolina

The Executive Committee of the Builders' Exchange of North Carolina recently held an important meeting, when plans were commenced for the semi-annual convention of the organization, to be held July 19 and 20 at Wrightsville Beach. It is expected that the meeting this summer will consider many matters of importance to the building business in that State. One of these will undoubtedly be the organization of a general contractors' association, a sub-contractors' association and a material men's association. Each association will meet separately on the first day of the convention and will have its own officers. This arrangement is expected to greatly expedite the work in hand.

Sacramento Builders' Exchange

The new Builders' Exchange at Sacramento, Cal., which formed a temporary organization about the first of the year, has elected a new Board of Directors, which later held a meeting and re-elected the former officers, Fred E. Conners being president. The Exchange now has 110 members.

Ralph McLaren Entertained by New Orleans Exchange

One of the delegates to the recent Baltimore convention of the National Association of Builders' Exchanges was Ralph McLaren, a supervisor of San Francisco and a director of the General Contractors' Association of the latter city. When journeying homeward he went by way of New Orleans, in which city he was the guest of Treasurer James M. McGowan of the Contractors' and Dealers' Exchange of New Orleans. Mr. McLaren was shown the points of interest around the city, taking in the mammoth warehouses along the waterfront, inspecting the purification plant, etc. Mr. McLaren, it may be interesting to state, was one of the men in San Francisco who was at the head of the rat-proofing of his native city, and Mr. McGowan is now devoting a great deal of his time in New Orleans to that important duty.

The Saginaw Builders' Exchange

A meeting designed to promote the interests of the Builders' and Traders' Exchange of Saginaw, Mich., was recently held in Teutonia Hall, when builders and members of allied trades to the number of 100 were present. The Mayor spoke a few words of welcome and alluded to the industrial and civic prosperity of Saginaw. Fred C. Trier, president of the local Exchange, gave an earnest appeal for increased membership and hearty co-operation on the part of all interested. Much of the great success of the evening was due to his efforts.

Those present enjoyed a fine banquet and listened to a number of addresses of Saginaw and State speakers. The toastmaster of the evening was A. W. Tausend, and among those who had something to say were Congressman J. W. Fordney, State President C. S. Wilcox and Secretary Robert K. Orr of Lansing. Mr. Orr referred to the importance of keeping posted on current legislation and suggested that each local take up the matter with its legislators. President Trier invited every builder or firm to join the Exchange, and stated that an office would be opened where sub-contractors could examine plans. He urged a general meeting every quarter.

Master Builders' Exchange of Salt Lake City

Advices from Secretary J. M. Silvers of the Master Builders' Exchange, Continental Bank Building, Salt Lake City, Utah, indicate active preparations for a considerable amount of building this season, the work including all varieties of structures. The Exchange is in a flourishing condition and at the annual meeting officers for the ensuing year were chosen as follows:

President—J. H. Angel.
Vice-President—Martin Benson.
Secretary—J. M. Silvers.
Treasurer—Augustus Rudine.

An Executive Committee consisting of three members was also chosen, consisting of E. H. Dundas, George R. Cushing and O. Chytraus.

Brief Review of the Building Situation

Building Operations for April in 116 Cities Show an Increase of 14.22 Per Cent Over April, 1915

THE planning of new construction work throughout the country continues to make a gratifying showing as compared with this season last year, the figures covering 116 cities indicating an increase of 14.22 per cent over April, 1915. As the situation a year ago was practically on an equality with that of April, 1914, and as April of that year showed a loss of 15½ per cent, as compared with April, 1913, it will be seen that present conditions are therefore about normal. It is well known that April marks the beginning of the building season and it is gratifying to note that in all sections of the country from which reports have been received the activity over last year is marked. Conforming to the practice of the immediate past of dividing the country into four zones or sections, it is found that the cities of the East indicate a gain over April last year of 10.16 per cent.

CITIES OF EASTERN STATES

	April, 1916	April, 1915
Albany	$432,455	285,745
Allentown	370,720	146,295
Altoona	140,933	113,570
Auburn	42,550	33,295
Binghamton	193,850	180,335
Bayonne	66,465	54,680
Boston	6,837,000	5,257,000
Bridgeport	646,437	1,493,413
Brockton	100,110	80,803
Buffalo	803,000	1,190,000
East Orange	215,143	132,501
Elizabeth	63,245	121,825
Erie	282,449	213,918
Harrisburg	373,445	95,375
Hartford	1,091,511	584,602
Haverhill	154,100	113,050
Hoboken	63,860	79,750
Holyoke	186,860	21,650
Jersey City	512,583	694,940
Lawrence	273,320	98,325
Manchester	124,027	909,520
Newark	842,617	549,846
New Bedford	779,665	434,520
New Haven	406,630	465,320
New York:		
Manhattan	8,599,760	6,920,467
Bronx	1,923,473	3,057,143
Brooklyn	3,952,243	5,290,515
Queens	2,387,868	2,412,905
Richmond	370,971	389,787
Passaic	111,675	81,099
Paterson	252,309	124,516
Philadelphia	6,227,780	3,449,900
Pittsburgh	1,250,762	974,283
Quincy	223,269	154,725
Reading	255,150	111,375
Rochester	1,168,294	1,159,257
Scranton	110,873	118,052
Schenectady	213,561	101,748
Springfield	465,785	365,475
Syracuse	1,083,837	1,172,105
Trenton	327,623	219,000
Troy	54,896	60,745
Utica	153,340	37,925
Wilkes-Barre	69,905	119,746
Worcester	556,848	542,860

In what may be designated as the Middle Zone, this embracing the territory west of Pittsburgh and east of Denver, thirty-five cities report an increase in the amount of work planned of 19.59 per cent. Of the cities reporting twenty-three show increases and twelve decreases. Of the former, Chicago, Canton, Columbus, Duluth, Grand Rapids, Indianapolis, Kansas City, Minneapolis, Toledo and Wichita, Kan., are conspicuous, while the more important decreases include Cincinnati, Cleveland, Detroit, Milwaukee, Davenport and Topeka.

CITIES IN MIDDLE STATES

	April, 1916	April, 1915
Cedar Rapids	205,000	251,000
Canton	451,455	218,520
Chicago	11,371,600	6,820,700
Cincinnati	1,156,165	1,317,485
Cleveland	2,625,055	3,076,385
Columbus	1,166,840	406,555
Davenport	85,330	108,022

CITIES IN MIDDLE STATES (Continued)

	April, 1916	April, 1915
Des Moines	162,075	225,223
Detroit	3,796,560	4,268,460
Duluth	612,348	340,178
East St. Louis	93,585	378,280
Evansville	140,851	70,198
Ft. Wayne	349,236	238,520
Grand Rapids	488,097	298,394
Indianapolis	861,674	776,511
Kansas City, Mo.	1,219,949	1,125,170
Kansas City, Kan.	105,864	147,560
Lima Ohio	143,100	105,575
Lincoln	426,260	195,999
Milwaukee	822,371	1,115,750
Minneapolis	3,035,085	1,951,235
Omaha	406,935	389,420
Peoria	103,769	317,305
Richmond, Ind.	53,000	25,000
Saginaw	39,705	69,816
St. Joseph	260,519	130,320
St. Louis	1,003,146	986,719
St. Paul	966,504	829,914
Sioux City	214,250	201,670
Springfield	215,425	115,115
Superior, Wis.	131,180	95,480
Toledo	1,188,467	959,042
Topeka	62,967	108,875
Wichita, Kan.	387,510	36,150
Youngstown	373,001	219,505

The Southern cities reporting show a greater increase as compared with April last year than any other sections reporting. Here twenty cities indicate a gain of 20.24 per cent, this being brought about by thirteen cities showing increases and seven decreases. Baltimore, Birmingham, Nashville, Norfolk, Oklahoma and Richmond show the greatest gains, while Dallas, Jacksonville, Memphis, New Orleans and Savannah show a falling off in building activity.

CITIES IN SOUTHERN STATES

	April, 1916	April, 1915
Atlanta	573,647	446,337
Baltimore	763,275	388,213
Birmingham	370,720	146,295
Chattanooga	91,300	44,295
Columbia, S. C.	31,082	22,625
Dallas, Tex.	186,701	492,175
Huntington	163,225	60,210
Jacksonville	58,485	216,335
Louisville	298,890	282,560
Memphis	282,545	438,355
Montgomery	46,100	54,015
Nashville	542,448	70,078
New Orleans	242,061	339,571
Norfolk, Va.	226,394	163,218
Oklahoma	193,085	46,865
Richmond	595,608	370,114
Savannah	102,875	209,795
San Antonio	124,928	131,955
Tampa	135,130	106,665
Waco, Tex.	52,605	22,575

The section showing the smallest increase over last year is the extreme Western portion of the country, from which come reports from sixteen cities with twelve showing increases and four decreases. The most notable gain is in San Francisco, with Tacoma, San Diego, Oakland, Denver and Fresno ahead of last year. The notable decreases are found in Los Angeles, Seattle and Spokane.

CITIES IN EXTREME WESTERN STATES

	April, 1916	April, 1[illegible]
Colorado Springs	28,373	12,045
Fresno, Cal.	110,427	71,202
Denver	340,960	329,590
Long Beach, Cal.	79,847	75,712
Los Angeles	1,304,407	1,591,399
Oakland	706,479	530,302
Pasadena	189,813	96,923
Portland	23,671	19,875
San Diego	208,454	95,360
Salt Lake City	260,745	252,852
San Francisco	2,247,187	1,669,089
San Jose	86,251	103,077
Seattle	556,510	837,105
Spokane	62,184	126,875
Stockton	77,780	38,503
Tacoma	185,110	47,889

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Composite Metal Lath

One of the latest candidates to popular favor in the way of a lath for use in connection with building construction is illustrated herewith. It is known as Composite Metal Lath, and is referred to as something of a radical departure in the field, consisting as it does of 19 gauge wire woven in a loom ¾ in. mesh and almost completely covered by small crosses of brick clay pressed over the intersection of the wire in design, so as to inclose it, as clearly indicated in Fig. 1, which represents a portion of a sheet of the lath. It is then passed through specially constructed ovens, where it is subjected to a very high degree of temperature, then allowed to cool, after which it is ready for the market. The gage of wire used for the lath is governed by the purpose for which it is to be used, but it has been found by the manufacturers, the Composite Metal Lath Company, 128 Broadway, New York City, that the standard adopted will meet practically all requirements. The thickness of the lath and the form of the bricklets, by which name the clay pressed on to the wire is designated, allow it to be stapled directly to any flat surface, that it can be used as a self-centering reinforcement for segmental work. As the wire used in the construction of the lath is said to be annealed and highly oxidized in the factory it withstands dampness and is therefore adapted for use in laundries, bathrooms, dye rooms and similar places. It is very flexible, as the bricklets

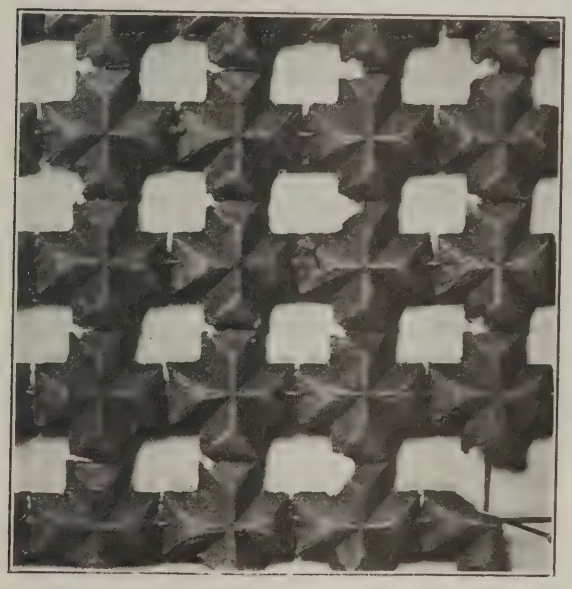


Fig. 1—The Appearance of the Lath, Practically Full Size

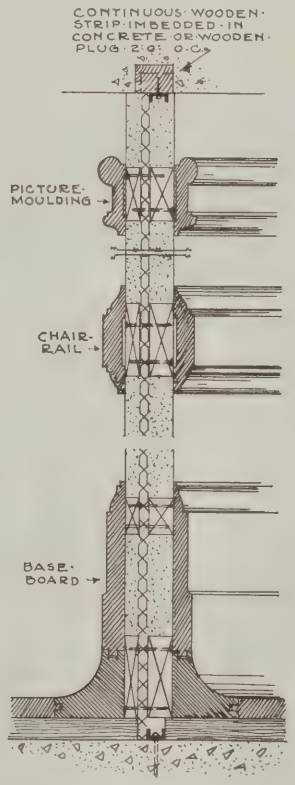


Fig. 3—A Vertical Section, Showing Method of Securing Grounds for Base Board, Chair Rail and Picture Molding

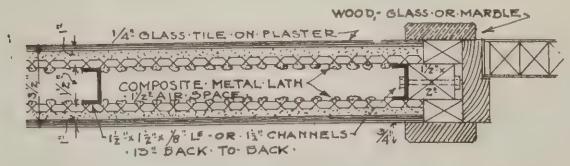


Fig. 2—A Horizontal Section Through a 3½-In. Partition

Composite Metal Lath—Showing its Appearance and Application

thus avoiding the necessity of furring strips. Figs. 2 and 3 afford an excellent idea of the use of the lath in building construction, representing as they do a horizontal section through a 3½-in. partition, and a vertical section showing the method of securing grounds for base board, chair rail and picture molding. The point is made that this form of lath is especially well adapted for use in connection with stucco work; is also fire retardent and can be used as a reinforcement for concrete slabs or arches. The claim is also made that it can be used as a self-centering reinforcement for segmental work. As the wire used in the construction of the lath is said to be annealed and highly oxidized in the factory it withstands dampness and is therefore adapted for use in laundries, bathrooms, dye rooms and similar places. It is very flexible, as the bricklets or little tile crosses are reduced in thickness at every junction so that they will not crush. The idea of this feature may be gathered from an examination of Fig. 1. Composite Metal Lath is made in 16-ft. lengths 40 in. wide, and is furnished in rolls 40 in. long and 10 in. in diameter, each roll containing 55 sq. ft. and weighing about 55 lbs. The company calls attention to the fact that the lath is not subject to injury in handling or shipping owing to the hardness of the bricklets and the elasticity of the wire.

Rapid Development in Use of Wall Boards

Perhaps with but one exception there is no new use for wood fibers that have made such rapid development in the United States in the past ten years as its use for wall boards. It is stated from what is considered good authority that the consumption of wall board in the United States for the year 1915 was probably in excess of 480,000,000 sq. ft.

The use of wall boards for interior work, in place of lath and plaster, would almost appear to be a new principle in building, and to a certain extent it is. At the same time, we find that the Japanese have employed a board for partitions for perhaps hundreds of years. The Japanese made their boards from a very strong fiber, which they obtained from the tough inner bark of six species of deciduous trees, this inner bark having long, tough, fiber cells. The bark most in use by the Japanese is taken from the mulberry tree. In order to obtain the fibers the bark is boiled in hot water to separate the outer bark from the inner bark. The inner bark is then dried and bundled and shipped to the board maker. The method employed by the Japanese for reducing the inner bark to the pulp form is very primitive. They employ a crude mallet, with which they beat the bark against a flat surface like a flat stone until it is reduced to a pulp. It is then subjected to further beating in water to thoroughly separate the fibers, after which the usual methods of making board by hand are employed. This process was introduced into Japan from Korea about the year 610 A. D., and the board made from this process has been used for partitions between different rooms.

During the development of the wall board industry in the United States the principal raw material used has been mechanical ground wood pulp and old papers. It is, therefore, in line with progress that improvements should develop both in the raw material used and in the method of construction, and it is interesting to note that one of the most recent developments in wall board, which appeared on the market some two and one-half years ago, has followed to a certain extent the raw material employed by the Japanese. In place, however, of the fiber obtained from the inner bark, this modern process uses the fiber obtained from the root of the tree, it having been demonstrated that products made from the root fiber are far stronger than products made from the fibers of the tree itself. The process of reducing the root is distinctly modern, for in place of the crude method employed by the Japanese the modern method employs chemicals, and the root fiber is put through a process that removes all the pitch starch matter, and all other vegetable matter natural to the fibers, leaving what might be termed a commercially pure cellulose; that is, as one authority states, the plant structure.

This pulp, or more correctly speaking, chemical fiber is by modern machinery manipulated and built up until it is placed on the market in the shape of large panels for interior work.

The product obtained by this latest development in the wall board industry is naturally far superior to the product obtained by the earlier methods employed in the United States for making wall boards, not only from the fact that its raw material is made by the chemical process, therefore making a strong pulp, but objections which earlier products had have been overcome.

Nor has this root fiber product stopped in its development at producing this superior quality of wall board, for it has been found that the root fiber board has certain characteristics that the ground wood boards have not, and by taking advantage of these facts, plus a patented process for indenting or engraving the board, there is now being produced panels in imitation of the real wood veneer panels, and so carefully and completely has this process been worked out that these panels may be finished in the various stains used in finishing the real wood, and so varied are the grains that the real wood and the synthetic wood when placed side by side are practically identical in appearance.



Fig. 4—Living Room of a Cottage at Atlantic Highlands, Showing Ceiling and Side Walls Covered with Wall Board

At a recent convention an exhibition prepared by one of the largest varnish and stain manufacturers in the world showing what can be accomplished with this synthetic wood made from root fiber attracted the attention and comments of all, and the fact that panels 10 to 12 feet in length could be made to reproduce the old English and Dutch panels of one to two hundred years ago proved that the effects so much desired by the architect, interior decorator and builder were available. The many possibilities for this new product are evident. It is well adapted for use in churches, theaters and public houses for both walls and ceilings, for commercial houses where wood panel effects for the office and windows are desired, and last and most im-

(*Continued on page* 84)



Fiberlic For Walls and Ceilings

Features: Fiberlic exclusive feautures—a wall board made from root fibre, chemically treated to remove from the fibres all the starchy matter that might harbor mould growth, all the resinous matter, thus making it more fire-resisting. It is the only patented chemically treated, long-fibred wall board on the market.

Economy: Fiberlic is not merely a substitute, but a new principle in building, providing as it does a wall or ceiling which will not deteriorate. More economical than lath and plaster, facilitates quick construction and has stood the test of time.

Uses: Fiberlic effectually contributes to good taste in the development of fine interiors. From the viewpoint of utility it serves with equal facility the peculiar needs of Hospitals, Doctors' Offices, Stores, Theatres, and Office Buildings.

Finishes: Fiberlic Paints permit the use of soap and water and scrubbing brush in the removal of stains and dust, thus insuring a permanently clean surface. Fiberlic is susceptible to a variety of finishes and is not restricted to the use of our finishes where something else is preferred.

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This beautiful bath tub, which has been installed in some of the finest hotels of the country, as well as in thousands of homes ranging from the modest bungalow to the most elaborate mansion, is fully described in our book, "KOHLER of KOHLER."

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Seattle Los Angeles New York
Chicago London



Columbia Lavatory
"Viceroy" Bath—Plate V-12-A

portant, the home builder will well appreciate what this all means when he realizes that the wood panel effects so much desired are now available at prices that vary from 66 2/3 per cent to 150 per cent less than the cost of the wood veneer panels, and in widths and lengths that were only available many years ago when large trees were the rule and not the exception.

New Stanley Garage Door Holder

A device for use in holding open garage doors and of such a nature that it cannot fail to be appreciated by the owner of an automobile, who doubtless has experienced the danger of having the wind suddenly close the open garage door with a bang, thereby injuring his machine, has just been placed upon the market by the Stanley Works, New Britain, Conn., and a general application of which is shown in Fig. 5. It is known as No. 1774, is universal in application, easy to put on and may be used for either right or left-hand doors. It is simple and durable in construction and has but few parts. There is a rigid arm of U-shaped steel with attaching plates of heavy gage and large size, applied at sufficient distance from the hinged joint as to develop the maximum of holding power. Its length is 30 in. and the net weight per pair is 8 lb. Reference is made to the fact that a holder of this nature on the garage door serves as inexpensive automobile insurance, saves time in getting the car in and out, and adds to convenience while working in and about the building.



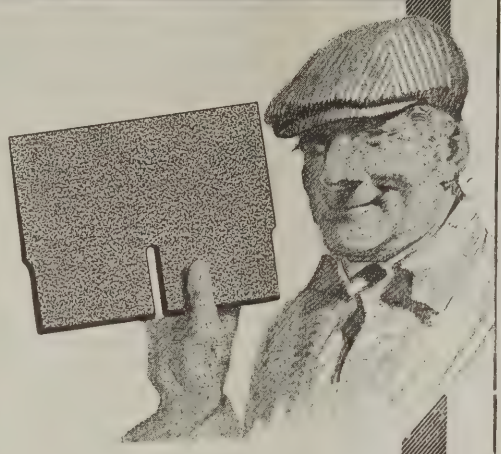
Fig. 5—Showing Application of Stanley Garage Door Holder

The Kuhn Patent Tongue and Groove Flooring

One of the most interesting developments in connection with floor construction has just been brought to the notice of the trade by The Interior Hardwood Company, 1308 Beecher Street, Indianapolis, Ind., and is known as the Kuhn Patent tongue and groove flooring. The feature of this new and improved flooring is found in the construction of the tongue and groove which is made in bevel form, thus rendering the tongue longer, stronger and with the under side reinforced so that it will not break, it is claimed, when the nail goes through it. The bevel in the new style allows the flooring to be drawn more tightly together besides saving the breaks. As a consequence, it is stated that a man can lay more of it in a day and can do a better job of flooring. It is made from carefully selected hardwood lumber, the claim being made that 80 per cent of it comes in lengths of 8 ft. or over; that no strip is shorter than 4 ft., while the 20 per cent average between 4 ft. and 8 ft. is well above 6 ft. On account of the bevel it is claimed that there is a very material saving over the old style of flooring, as every inch of the material can be used. It is carefully selected as to color and only uniformly colored strips are used. The accuracy of the machine work is said to insure a perfect fitting of each strip—exactly ⅜ by 2-in. face. Kuhn patent flooring

(*Continued on page 86*)

"This is a good shingle to hang around; yes sir.



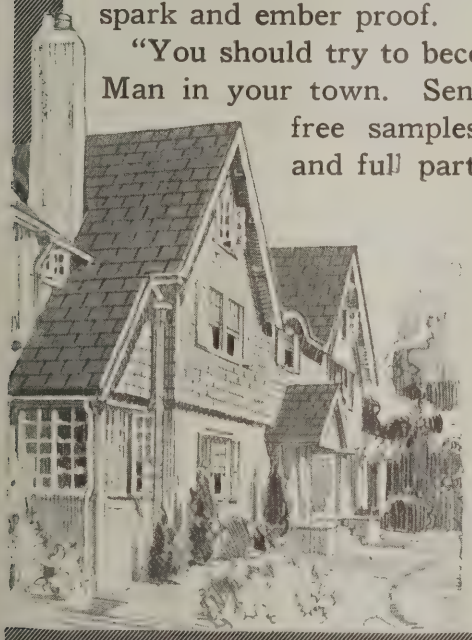
"It may not be a desirable article to spank Horace with, but that's the only thing the wood shingle has on it.

"It is making me prosperous; my life is just one Neponset Roof after another. Every customer becomes my salesman; that's why there is in this town an increasing number of handsome red, gray and green roofs of

NEPONSET SHINGLES

"They cost no more when laid than good wood shingles, yet they possess the durability and appearance of slate—they are spark and ember proof.

"You should try to become the Neponset Man in your town. Send the coupon for free samples, booklet, prices and full particulars."



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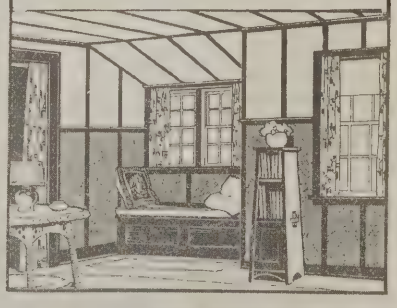
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like Neponset Shingles, sings for itself; one order brings another.

The carpenter who handles it is provided for the rainy days with indoor work.

To recommend it for ceilings, walls, paneling, wainscoting, etc., instead of plaster and lath, stamps you as an up-to-date man who keeps closely in touch with twentieth century progress.



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BIRD & SON, Dept. B, East Walpole, Mass.

Please send me Free Samples of Neponset Shingles and Neponset Wall Board, with booklets, particulars, etc. Also a copy of your book "Repairing and Building." This request does not obligate me in any way.

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Note how the Stanley Garage Door Holder does its duty, holding the door open against the strongest gusts of wind, yet a slight pull at the chain leaves it free to close.

ASK us for an interesting book, which will tell you why, on the garages you build, whether they are simple or elaborate, you will find it wise to use

Stanley Garage Hardware

THE book carefully illustrates and describes hardware suitable for all types of garages: wood, stone, concrete, etc.

We particularly want you to know about the Stanley Garage Door Holder No. 1774, featured in illustration above.

IT is strong and simple in construction, holds the door open, preventing damage to car lamps, bending of the fender or scratching of the paint.

Send for the book today. Stanley Garage Hardware may be had of most hardware dealers.

Stanley Works

New Britain, Conn., U. S. A.

New York
100 Lafayette St.

Chicago
73 East Lake St.

is made in quarter sawed oak, plain sawed white oak, plain sawed red oak, hard white maple, dark mahogany, black walnut, dark cherry and dark oak. The Interior Hardwood Company is sending free to those who desire it a copy of an attractive booklet containing valuable information and suggestions relative to hardwood floors, their making, laying, finishing and care. It is a useful little book for expert builders and contractors, as well as for home-owners.

New Plant of Buffalo Wire Works Company

In order to meet the growing demand for Buffalo wire products the Buffalo Wire Works Company has just moved its entire wire work department to 290 Terrace, corner of Genesee Street, Buffalo, N. Y., in the building formerly occupied by the Buffalo Meter Company. It is a brick structure, 67 x 70 ft. in plan, and five stories in height, giving the company an additional floor space of 25,000 sq. ft. Here the company has installed its wire work machinery for making window guards, desk and counter rails, elevator cabs, fencing, wire signs, ornamental panels, grilles, wickets, folding gates, lockers, tool room enclosures, etc. The new plant, a bird's eye view of which is shown in Fig. 6, practically doubles the company's capacity to manufacture these articles. The removal also enables it to increase the weaving department in the section formerly occupied by the wire work department. The company states that since opening last fall its Philadelphia branch at

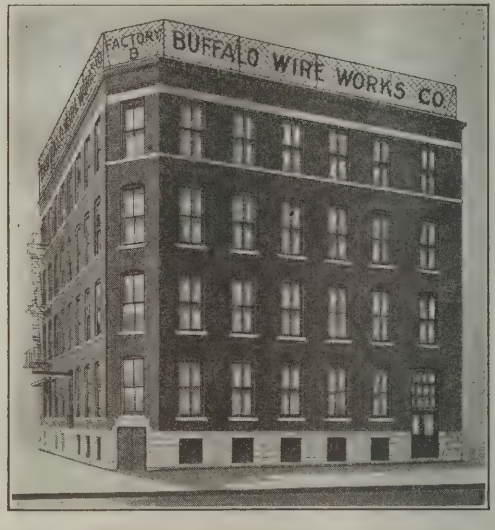


Fig. 6—New Plant of Buffalo Wire Works Co.

No. 11 South Seventh Street, it has been compelled to increase its quarters in that city, and it has taken three additional floors at No. 9 South Seventh Street, adjoining the present branch, which gives an additional 10,000 sq. ft. of floor space, thus enabling the company to carry a still larger stock of Buffalo wire products for its customers and patrons in Philadelphia and surrounding territories.

Why a Saw Cuts

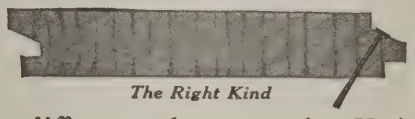
The saw has been called the "king of tools," and the important place which it has occupied in building operations from remote ages up to the present day justifies the title. A description of the way it cuts may therefore be of interest to the carpenter who makes use of it. When a knife cuts the edge will merely score to a certain depth and then become wedged or jammed in the wood, unless the latter is of exceedingly thin stock. A chisel, the cutting edge of which is most akin to a saw, separates and removes a long shaving by what may appropriately be termed paring or slitting. A saw combines the action of both knife and chisel, removing successive portions of material, called sawdust, by cutting and tearing. A crosscut handsaw possesses V-shaped teeth, the points set or bent slightly over for clearance of the body of the blade in the kerf; one point to the right, the next to the left, and so on

(*Continued on page* 88)

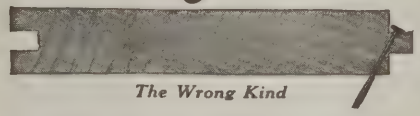
Why Your Choice Should Be Kuhn Patent Tongue and Groove Flooring

IN figuring material you can't afford to slight the hardwood floors. The satisfaction which goes with the smooth, even surface and the long-continued wear of every Kuhn Patent Tongue and Groove hardwood floor you lay brings the home-owner's commendation and more business for the contractor. And there is a greater profit for you in every job laid with Kuhn Patent Flooring.

Easiest to Lay



The Right Kind



The Wrong Kind

Notice the difference between the Kuhn Patent Tongue and Groove and the common kind. The Kuhn Tongue is longer and stronger and reinforced on the underside which prevents it from breaking off when nailing. At the same time the bevel makes the flooring draw up more tightly than the ordinary kind and prevents upper lip from breaking. Your men can lay more of it in a day. Adds to your profit.

Long Lengths

Eighty per cent of Kuhn Flooring is in lengths of eight feet or over. There's not a single strip shorter than four feet, and the average of the twenty per cent between four and eight feet is well above six feet.

You, who have probably often paid for the extra labor of finishing floors of short lengths, know what an added profit our long length flooring will give you.

No. 15, 1¾ in. C. C. flooring brads are used in laying.

Face Surface Measurements

When you buy ⅜-inch flooring with a 2-inch face, you pay for 2½-inch width of flooring—25% added for the tongue which is lost in laying. When you select Kuhn Patent Tongue and Groove Flooring, you pay only for actual width of the face of the strip.

This saving is another addition to your profits.

Face Absolutely Free From Defects

Every strip of Kuhn Patent Flooring is critically inspected for defects of any kind; all sap, knots or streaks are discarded. Kuhn Flooring is also most carefully sorted for color and only the even colored strips are included. Every inch of Kuhn Flooring can be used—no waste. Still more profit for you.

Accurate Membering

The Kuhn Patent tongue and groove are cut on special flooring machines, which insure accurate membering of pieces. It always fits. Frequent micrometer tests keep the thickness always at exactly three-eighths of an inch and the width of the face at two inches.

Our flooring gives utmost satisfaction to the home-owner as well as biggest profit to you, because through every process, from the forest to your "job," it is given the same careful handling and treatment. We use most improved machinery for manufacturing our flooring. Our workmen are all thoroughly skilled and competent. Our years of experience have brought us to the most approved methods.

Seasoning

The lumber is yard-seasoned for at least one year and kiln-dried for 30 days before manufacturing and the finished product kept dry in heated warehouses. No swollen tongues in Kuhn Patent Flooring—no split faces.

Kuhn Patent Flooring is made in

Quarter Sawed White Oak	*Dark Mahogany*
Plain Sawed White Oak	*Black Walnut*
Plain Sawed Red Oak	*Dark Cherry*
Hard White Maple	*Dark Oak*

Our location in the center of the choice hardwood district gives us every advantage for the very cream of quality in these woods, as well as for price and prompt deliveries.

We are also manufacturers of a complete line of beautiful Parquet floors, Borders and Wood Carpet of the very highest quality.

Before making another estimate for hardwood flooring of any kind, mail the coupon or a postal for our

Free Flooring Book full of information about hardwood floors, the making, laying, finishing and care. Suggestions of value even to the most expert builder, contractor, or home-owner. Get your copy now.

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1312 **Beecher Street** **Indianapolis, Ind.**

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Send me without obligation, your free Flooring Book and information about Kuhn Patent Tongue and Groove Flooring.

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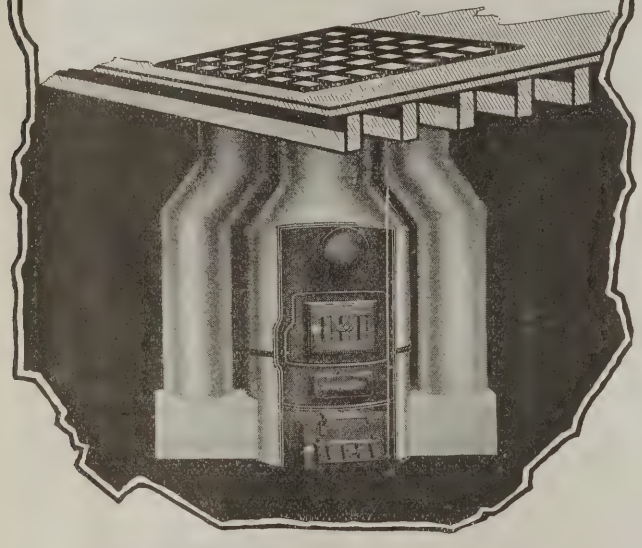
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building fireplaces should know the advantages of the Stover Dome Dampers.

The rod extends out under the brick or tile so there is no interference after the Damper is first set. Wide flanges allow giving sides of Fireplace any angle desired. Cover will not slip out of position. Castings are extra strong. Made with or without angle for carrying brick. We make other styles.

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alternately. Although the front and back of each tooth are beveled, it is the outside edge of the front of the point (the portion "set") that does the cutting. Each end of the "V" enters the wood, going deeper as pressure is applied until the cutting edge on the outside front of the points is brought in, the forward motion of the blade causing the points and cutting edges to strike the fibre at right angles to its length, thus severing it from the main body of the wood on each side of the blade and paring the ridge of wood between the scorings. The points continuously score on the stroke, their outside edge paring and the beveled front edge of each tooth in the cut, now in position, performing its chisel-like duty of crumbling up and dislodging the upper portion of the ridge of wood left between the cutters. The pieces are pocketed and carried out of the kerf by the throats or gullets at each thrust of the saw. A needle can be passed down between the teeth of a good crosscut saw, dividing the teeth so that one tooth is on one side, the next on the opposite side, and so on. A rip saw has its cutting edge chisel-shaped instead of pointed like the crosscut saw. The front is straight and the cutting edge strikes at right angles to the fibre of the wood, but severs it in one place only, the front of the tooth wedging out the piece of wood. With a view to demonstrating that the saw is based on scientific principles, an illustrated pamphlet by F. M. Bassler and copyrighted by Henry Disston & Sons, Inc., Philadelphia, Pa., has been prepared and given the title "Why a Saw Cuts." Though a handsaw consists of but a few parts, yet over eighty-two different operations are required to complete a Disston saw. A full understanding and appreciation of the work involved in its manufacture can be gained only by a personal trip through the works of the concern, where, step by step, in gradual development from crude, raw material, changed and refined in fiery furnaces, transformed under monster rolls, shaped by an army of expert mechanics, there finally emerges a beautifully finished and efficient article of utility. The principal operations which contribute to form the "king of tools" are explained at length in a booklet entitled "How a Disston Handsaw Is Made." Both of these booklets are well worth reading, and a copy will be sent free on request to the manufacturer.

The "Imperial" Floor Sander

There are numerous carpenters and contractors who feel the need of modern equipment to facilitate their work, but do not purchase the necessary apparatus because of the fact that prices, to them, are in many

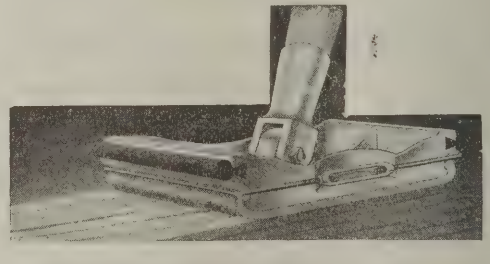


Fig. 7—The "Imperial" Floor Sander

cases prohibitive. Up-to-date devices that are manufactured at a low cost and are accompanied by an efficiency guarantee are always welcomed by the trade, and we therefore take pleasure in illustrating in Fig. 7 the "Imperial" floor sander, recently marketed by the Imperial Pump & Tool Co., 2446 West Twelfth Street, Chicago, Ill. This equipment is one that is well within the means of the carpenter and contractor and will command attention because of its construction, light weight and simplicity of operation. The floor sander weighs but 14 lb. and is said to be heavy enough to do perfect work and light enough for one man to handle without the slightest trouble. It holds from six to twelve sheets of sandpaper and is shipped to the buyer loaded and ready for immediate use. To the top and center of the sander is a 5-ft. ash handle,

(*Continued on page* 90)

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$2.25 per roll of 108 Square Feet





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Quality Wallboard
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The facts are that the Gordon-Van Tine Co. offers the *biggest, broadest, finest stock* of quality building material *on earth.*

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Try our speed service.
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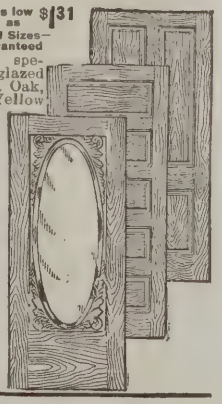
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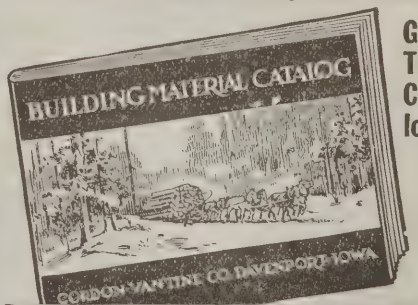
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Why Have Heating Pipes in Your Partitions?



Now that you come to think of it, heating pipes *are* an awful hitch on construction work, aren't they?

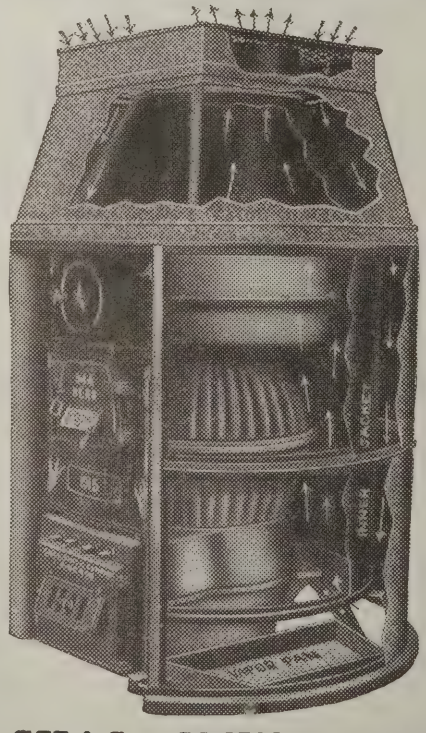
But you don't *have* to hold up your mason and paperhanger until the furnace man gets on the job. You don't *have* to take a chance of over-running the contract!

You can disregard the furnace proposition entirely until the house is completed. The Empire Pipeless Furnace does away with all partition work. May we tell you how it works?

CO-OPERATIVE FOUNDRY CO.

505 S. Clinton St. Chicago — Rochester, N. Y.

THE HERO PIPELESS FURNACE



Easy to Install

Also Manufacturers of

The Hero Lines

of Basement Furnaces, Hot Water Heaters and School Room Heaters.

Write for Prices and Catalog Also Agency Proposition

CHAS. SMITH COMPANY

57 W. Lake St., Chicago, Ill.

fastened by a knuckle joint, and heavy felt cushions are provided at each end to prevent marring baseboards when in operation. The sandpaper is securely held in place by means of ¼-in. binding rods, which are drawn together with an iron buckle. This buckle holds the sandpaper, and as the paper wears out it is not necessary to loosen the binder, but by simply cutting off the worn sheet the next sheet is exposed and ready for use. The handle is so arranged that the operator can get a free sweep, the sander always remaining flat on the floor. The operator can stand in the center of the averaged-sized room and swing the sander from side to side without changing his position. He may first use a coarse sandpaper as he works across the grain of the wood and a finer sandpaper as he finishes the floor with the grain of wood. The device is said to be especially adapted for dancing floors, counter tops, bowling alleys, skating rinks, etc., and will be found convenient for removing varnish and for resurfacing and waxing floors. The compay's catalog, which gives full particulars, together with the price, may be had on application to the given address.

Black Rock Wallboard

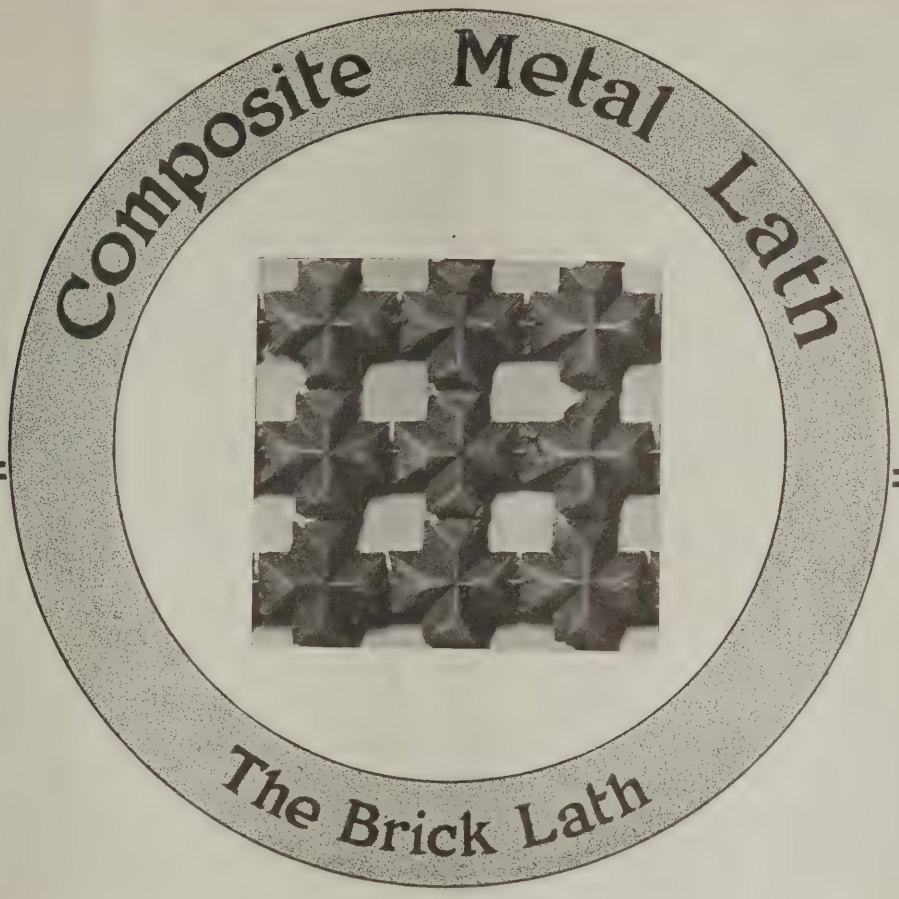
Supplementing the few comments which appeared in our last issue regarding the above-mentioned product, it may be of interest to builders to state that the wall board is made of four plies of material combined by a veneer process with a moisture-repelling black center.



Fig. 8—Showing Application of Black Rock Wallboard as an Interior Finish

This "stiff-as-lumber" wall board, as it is designated, has just been placed on the market and takes its name from its place of manufacture on the Niagara River. It is made by the Black Rock Wallboard Company, 1525 Ontario Place, Black Rock, N. Y., which claims that this name was chosen because "Black Rock" described in a way exactly what it aimed at in making a new wall board; that is, weight, strength and permanence. The claim is made that it will not warp, buckle, bulge or peel away from the nails; first because of its structure, second because of its weight and strength, and third because being strong and heavy carpenters find it easy to work and consequently are able to put it on the walls in first-class shape. Emphasis is laid upon the distinctive feature of the wall board, and that is its moisture-repelling black center. The company claims that the center being the heart of any board requires treatment just as much as the outside surface, and for the center it has selected certain well-known waterproofing agents which are black in character. This gives Black Rock Wallboard its distinctive center. The plan of the company is to have in practically every town one representative who alone will have the exclusive sales rights. As the company intends to adhere rigidly to this policy, it believes that these exclusive dealers will find the handling of its product an ever-growing proposition. In Fig. 8 is shown an interior where this wall board has been used as a finish.

(*Continued on page 92*)



A Revolution In Metal Lath

Here is the only metal lath with suction. Composite Metal Lath is a wire mesh covered with brick-clay under pressure and baked. It is made from the materials of which the largest and most wonderful structures are made—iron and brick. The picture above shows a section of Composite Metal Lath—Full Size View.

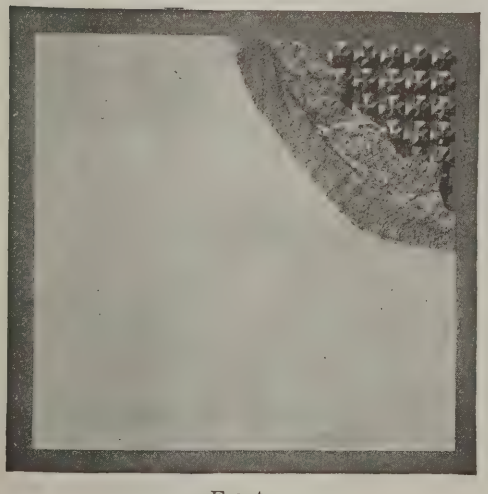
It makes adhesion positive—no falling of mortar from walls and ceilings—no excess loss by "pushing through." It assures a permanent bond.

Very flexible and easily handled. Can be erected with great rapidity and ease.

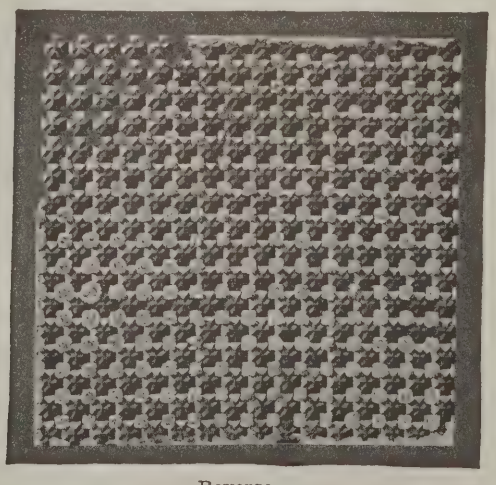
Composite Metal Lath is used with success for all outside or interior work. **No more cracking or falling stucco.** Send for circular and samples.

The Composite Metal Lath Co.

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Reverse

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In the past few years thousands of stucco homes have been built in Minneapolis, St. Paul, Kansas City, etc. All over the country the demand for good stucco is increasing. It is attractive, fire-resisting and requires no painting and very little upkeep. It is ideal for new homes and for remodeling old brick or wood homes, for garages, porches, dairies, etc.



A New Book that really helps We have gathered a great deal of information about well-built Stucco into a "Guide to Good Stucco," a book containing detailed drawings of the different types of stucco construction, and a practical set of Stucco Specifications, to meet your needs. We will send you this book free. Also the Contractor's Atlas—a monthly digest of successful construction and sales ideas—and any other information that you ask for. Use the coupon below.

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Name..... Address.....

New Sales Offices of the Kohler Co.

Rapid business growth and the widespread demand for Kohler Enameled Plumbing Ware have necessitated the opening of new sales offices at 404 Morris building, Philadelphia, Pa., with H. J. Hanna, Jr., as manager; at 1410 Candler Building, Atlanta, Ga., with R. G. Dobson as manager; at 3005 Jenkins Arcade Building, Pittsburgh, Pa., with Harry E. Clark as manager; at 725-726 Merchants National Bank Building, St. Paul, Minn., with Charles A. McKenzie as manager; at 1148-1152 David Whitney Building, Detroit, Mich., with Bart Downey as manager; and at 308 and 309 Pantages Building, Seatle, Wash., with W. B. Lambert as manager. The factory and general offices of the company are located at Kohler, Wis., with old branches and warehouses in the same cities as heretofore.

Wood-Mosaic Floors

A handsome *brochure* containing numerous halftone engravings of buildings in which its product has been used, has just been received from The Wood-Mosaic Co., 32 Hebard Street, Rochester, N. Y. It gives much valuable information regarding wood-mosaic floors and in addition are illustrated many patterns in natural wood colors. The statement is made that the company can reproduce almost any carpet design in a hardwood floor by the use of various woods the names of which are set forth. The cost of one of these floors, laid and finished, is said to be very near the price of a carpet, but ultimately, of course, much cheaper. Wood-Mosaic floors can be laid over an old floor with very little change in the floor level, doorsills, etc., by the use of wood 5/16 in. thick. If its agents are not near at hand, the company furnishes complete and accurate instructions for the laying of the floors so that the local carpenter need not go astray. A steel woven wood-mosaic floor is made to meet requirements of buildings of fireproof construction. The floor is made of blocks about 1 in. thick and 4 in. square. These blocks are grooved on all four sides and threaded on the floor onto strips or bands of steel, being so placed as to make the whole floor one solid, heavy mat. The floor is held in place by its own weight, and not being attached to the concrete, is at liberty to expand or contract. Compression strips close to the wall take up the expansion.

Edwards Metal Ceilings

An attractive catalog of 160 pages, bearing the above title, and containing a wide variety of patterns of Edwards' metal ceilings in "Stucco-Steel," "French Renaissance," "Italian Renaissance," "Colonial," "Gothic," "Rococo," "Greek" and "Modern" designs, has just been issued from the press. The illustrations are nearly full page size, thus allowing the architect or builder to readily obtain a clear idea of the details of each pattern. List prices, based on various sized rooms, are given, together with brief descriptive data of value to the builder and sheet metal contractor. There are also illustrations and prices of designs of side walls, cornices, moldings, borders, centers, etc. Among the closing pages are directions for measuring the amount of material required for rooms of any size, and there are also directions for applying it. With every pressed steel ceiling sold the company furnishes a drawing showing the arrangement of the metal, also a packing slip which contains an itemized list of all material, together with catalog number and size of each piece. Photographic views of interiors show some of the beautiful effects which may be obtained by the use of metal ceilings. The catalog is issued by the Edwards Manufacturing Company, 423-443 Eggleston Avenue, Cincinnati, Ohio, and the statement is made that any

(*Continued on page 94*)


Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as he expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

Occupation.....

City.....State.....

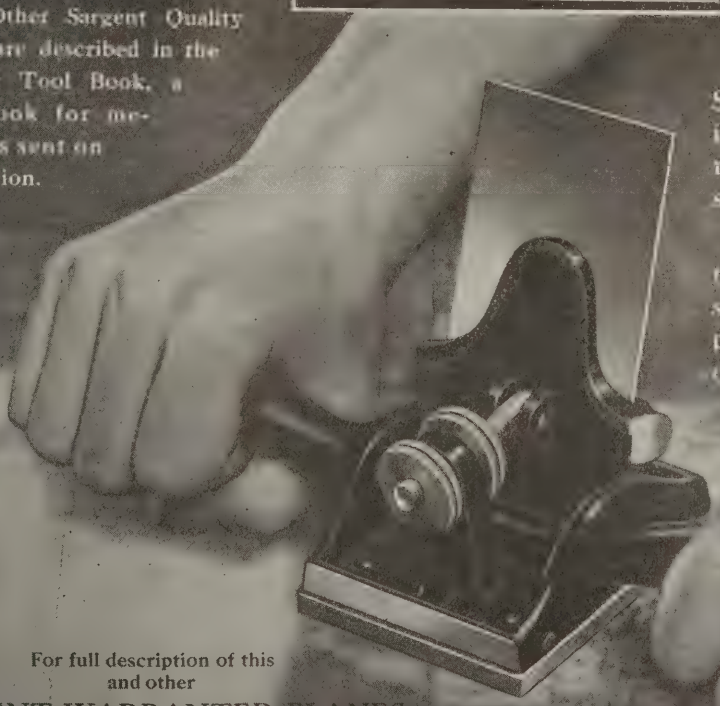
SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

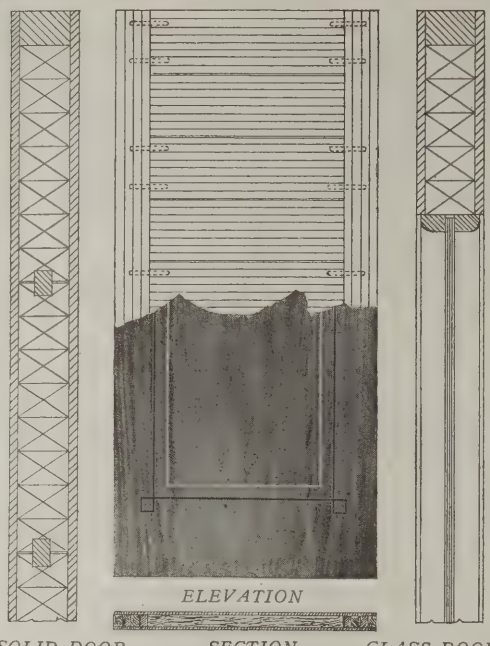
No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.



For full description of this and other
SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET
SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
53 Water St. New Haven, Conn.



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

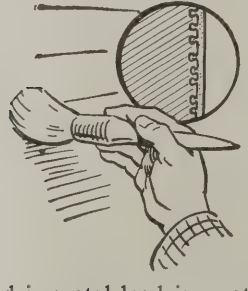
Manufactured by

HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

LEAD PAINT
Dovetailed On



PURE white lead is metal lead in another form. Under a blow-pipe flame, it returns to the metallic state. A building painted with strictly pure white lead and pure linseed oil, like

Dutch Boy White Lead

and Dutch Boy linseed oil, is sheathed in a solid coating which, while not lead, is derived from this durable metal and has many of its characteristics.

This lead-like sheet, instead of being nailed on, might be said to be dovetailed fast, for it is held by thousands of tiny tentacles of the coating material itself. It is only as thin as paper but plenty thick to withstand the extreme changes of wet and dry weather and of burning heat and biting cold.

Folders "C" FREE Our handy, general painting specifications and useful chart of color combinations should be in your catalogue file. Write nearest branch for Folders "C."

NATIONAL LEAD COMPANY

New York Boston Cleveland Chicago
Cincinnati Buffalo St. Louis San Francisco
(John T. Lewis & Bros. Co., Phila.)
(National Lead & Oil Co., Pitts.)



architectural effect can be obtained by the use of its ceilings, while any shade or color desired may be applied.

Corbin Rim Night Latches

A lock whch will promise security against assault is not the least important feature in a house, and in an interesting publication known as "No. K-19" issued by P. & F. Corbin, New Britain, Conn., there is set forth a description of the ease with which the Corbin lock can be affixed to a door. The several steps are carefully illustrated, and the reader is told how well the lock is protected after being attached. It is stated that the lock can be used for either a right or left-hand door without change, two strikes being supplied so that the lock can be fitted to a door opening either in or out. It is said that these locks can be used on swinging doors and doors as thin as seven-eighths of an inch. The ball-bearing pin-tumbler cylinder used on the outside of the door is the same cylinder that is used on the highest grade of Corbin locks. It is said to have practically an unlimited number of changes of key, a keyway which will not admit a picking tool of any kind, ball bearings which permit the keys to pass in and out easily, and a master-keying system which is flexible, compact and trustworthy. In types not employing a pin-tumbler cylinder a secure locking mechanism is used. The tension of the spring is claimed to be sufficient to give the bolt a quick, lively action with a slight pressure on the knob, which is uniform throughout the entire movement. The pamphlet is illustrated with views of various portions of the locks, accompanied by a list of the supplied equipment and the price of a complete set per dozen. All locks are packed with directions for affixing.

Goodell-Pratt High Speed Hand Drill

One of the many new tools which the Goodell-Pratt Company, Greenfield, Mass., has recently added to its already extensive assortment is the High Speed Hand Drill No. 385, illustrated in a general view in Fig. 9. This new tool is one which cannot fail to be appreciated by wood finishers, floor layers and those who have occasion to drill a number of small holes in a short space of time. The gears, which are inclosed in an aluminum casing and packed in heavy grease, cause the spindle to make seven revolutions for each turn of the crank, the spindle running in ball bearings. The gears are lathe turned and machine cut. The chuck is of the three-jawed type and holds round shank drills, from 0 to ¼ in. The handle is of polished hardwood with a large head.



Fig. 9—The Goodell-Pratt Hand Drill

Some Features of Asphalt Shingles

The utility and growing popularity of Asphalt Shingles among builders and property owners makes any instructive information relative thereto of more than usual interest at the present time. With a view to throwing light upon the merits of roof coverings of this nature, the Asphalt Publicity Bureau, 854 Marquette Building, Chicago, Ill., has recently issued a pamphlet entitled "Asphalt Shingles" which contains among the early pages some reference to the fact that "History Proves the Efficiency of Asphalt." The statement is made that waterproof materials, such as asphalt, pitch and bitumen, were used in prehistoric times in many ways. Their application to the royal mummies of Egypt and other ancient things show that the materials have endured in tests lasting thousands of years, as is proved by archæologists. An asphalt shingle

(*Continued on page* 96)



Distinctly Different

Here is the reason. The "Trouble-Saver" Building Bracket has two legs instead of one. These mean stability. No shaky, unsafe, scaffolding with the "Trouble-Saver Building Brackets."

The legs brace against each other at the outer end and prevent any side motion. The bracket takes hold of the studding directly—no motion at the inner end.

"Trouble-Saver" Building Bracket

Up go "Trouble-Saver" Steel Building Brackets. You can erect as many in 5 minutes as you can wooden brackets in 5 hours. And it is just as easy to take them down.

Use "Trouble-Saver" Steel Building Brackets. It means a saving on time, material and labor; make your men feel perfectly safe, give them firm, solid and safe footing. Write for particulars.

The Steel Scaffolding Co.

Evansville Ind.

The Keen Satisfaction of having Keen Tools

CARBORUNDUM Sharpening Stones, in your tool-kit or on your work bench, insure this satisfaction. The ordinary sharpening stone wears the edge on the tool; a Carborundum stone cuts. It leaves the tool with a smooth, true edge. A favorite stone for general use is the

Carborundum Round Combination Stone

You use every inch of it—no waste stone. It's round so as to allow for circular motion in sharpening chisels, plane bits, etc. ¶ There are other shapes and sizes; in fact, there is a Carborundum stone for every sharpening need.

Send 15 cents for handy pocket stone.

The Carborundum Company

Niagara Falls, N. Y.



Narrow Mullions

ASK FOR PLAN



for sleeping porches, triple windows and bay windows which has met with wide approval among architects. It effects a saving in construction, cuts down mullions to the minimum, and gives maximum glass area.

This plan free for the asking. Write for it today. Also our complete catalog.

PULLMAN MFG. COMPANY
8 Industrial St., ROCHESTER, N. Y.
Manufacturers of
Pullman All Steel Unit Sash Balances

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

is composed of a flexible body of wool felt made of very tough and strong long fibre. Hot asphalt is forced through every fibre and into every pore of this felt. It is then coated above and below with asphalt. On the upper surface is put a layer of crushed slate or rock, forced in under enormous pressure. A lower surface of crushed mica or other substance is put on to prevent sticking during transit, and this gradually wears loose after laying, allowing the shingles to bind closely together. The combination of these materials forms an elastic shingle which has enough pliability to give slightly under strain and which is yet stiff enough not to curl or blow up. It is stated that the slate or rock surfacing is permanent in color and that the shingle is an enduring guard against cracks or leaks. The original cost, it is claimed, compares very favorably with that of commonly used roofings and cheaper than slate or tile. The colorings of crushed rock include dark red, green, deep green, black, brown and gray. Asphalt Shingles are uniform in size, cleanly cut and measure about 8 in. wide by 12½ to 12¾ in. It is stated that they can be bent around corners and produce beautiful roofing effects. No changes are needed in order to use Asphalt Shingles in place of other materials. After the old roofing has been removed, they can be applied as quickly and easily as on a new house.

The Munger Three-Door Combination

A product which has many features of interest to carpenters and builders and known as the Munger "Three-Door Combination," has recently been brought

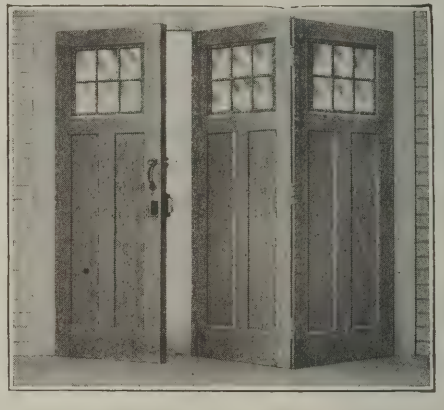


Fig. 10—The Munger Three-Door Combination

out by the Chicago Millwork Supply Co., 1424 West Thirty-seventh Street, Chicago, Ill. The company calls attention to the fact that the door of a garage is a most important fixture and should be substantially constructed, easily operated and thief proof. The model shown in Fif. 10, is a combination set of three doors to fit a standard opening measuring 8 x 8 ft. The doors are 1¾ in. thick, made of Oregon fir and weigh about 85 lb. each. They are 2 ft. 8 in. x 8 ft., and are furnished in two designs: the Stutz full paneled door or the Hudson, which has glazed double strength glass, as illustrated. Unlike the ordinary "barn-like" ceiling garage door, they are built as good as a house door and cost much less. The company guarantees perfect joints, good workmanship and strong construction. It is interesting to note that the owner may use the dead lock door for a private entrance, thereby saving a side door and frame. This is the season of the year when the carpenter and contractor are called upon to undertake considerable garage work, and the prices made will permit readers of THE BUILDING AGE to take advantage of the bargain offered on page 61 of the company's catalog, No. 321, as a means of building up much desirable business during the summer season.

Water Supply for Country Homes

One of the problems which confront the builder of a country home is the provision for an adequate supply of water in all parts of the house when no public main is accessible to be tapped. A fifty-page booklet, entitled,

(*Continued on page* 98)



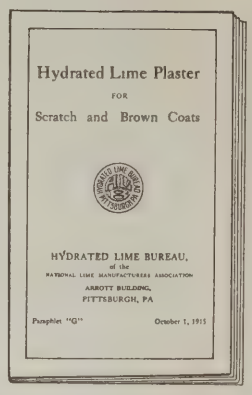


THESE HOMES PLASTERED WITH HYDRATED LIME PLASTER

SOUND CARRYING WALLS ARE DONE AWAY WITH.

PLASTER YOUR BUILDINGS WITH

HYDRATED LIME PLASTER



FOR SCRATCH AND BROWN COATS. Absorbs and deadens sound. Puts quiet conditions into the home.

Ask for Bulletin G—Contains Complete Information.

FACTS ABOUT HYDRATED LIME PLASTER

SOUND—Dries out with millions of tiny dead air cells which make the walls absorbers of sound and produces quiet conditions in the home.

STRAIGHTER WALLS—Permits plasterers making straight and true angles and surfaces.

LATH—Permits eliminating lath cracks and buckling.

ECONOMIES—Has a high sand carrying capacity; also makes a saving in plaster through retempering the droppings.

COST—Costs no more per ton than other plasters.



HYDRATED LIME BUREAU
OF THE
NATIONAL LIME MANUFACTURERS ASSOCIATION
1609 ARROTT BLDG.
PITTSBURGH PENNA.



Tests every hour—day and night

The chemist is a man of real authority in every ALPHA plant. He cannot be overruled by men zealous for large or economic output.

The hourly system of tests, beginning with the quarry borings, is followed strictly. Result: It is impossible for cement that is lacking in binding power to be shipped from an ALPHA plant.

Send for ALPHA book No. 17. This valuable book—illustrated—tells how to do stucco work, how to build concrete barns, silos, ice-houses and other small buildings, foundations, walks, tanks, storage cellars, steps, etc.

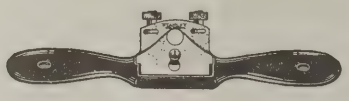
ALPHA PORTLAND CEMENT CO.
General Offices: Easton, Pa.
Sales Offices
Boston, New York,
Philadelphia, Pittsburgh,
Baltimore, Savannah



Stanley Tools



No. 151



No. 152

Stanley Adjustable Spoke Shaves

These new and improved Spoke Shaves have a Lever Cap fastening the cutter in such a manner as to bring an even pressure on the cutting edge.

The important feature is that the cutter can be quickly adjusted both endwise and sidewise by means of the adjusting screws which engage the slots near the end.

The cutters are made from a high grade of steel, well tempered and sharpened ready for use.

The handles are japanned and through each a hole is made to enable the owner to hang the tool up out of the way.

Made in two styles—one with raised and the other with straight handles.

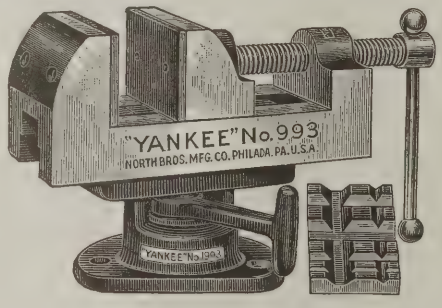
If your dealer cannot supply you write us direct.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Here's a New Vise

"YANKEE" No. 1993

With Swivel Base. DETACHABLE



Quickly detached from swivel base by the turn of a set screw; and being accurately machined all over can be used in any position as a jig for special work on drill press, shaper, etc.

Holds work rigid at any angle with use of the special grooved block.

The swivel base is easily and firmly locked and released in any position by a short movement of lever at the side. Jaws 2¾ in. wide, 1⅞ in. deep, opening 3⅛ in., base 7½ in.

Ask your dealer to show you.

Let us send you the "YANKEE" Book. A postal brings it.

Tells you all about the "Yankee" line

NORTH BROS. MFG. CO.
Lehigh Ave., PHILADELPHIA, PA.

"Standard Pumping Units," containing illustrated descriptions, prices, directions for installation, etc., of various plants, severally applicable to deep or shallow wells, as may be necessary, is being sent out by the Standard Pump and Engine Co., Akron, Ohio. Hand power, electricity or engine-driven systems may be used, different sizes being suitable to requirements ranging all the way from those of two or three persons up to those of a large plant. A few pages toward the end of the booklet are devoted to tables of comparative equivalents of liquid weights and measures, open weir measurement, pipe friction, etc., likely to prove of interest.

Sheet Metal for Interior Decoration

An interesting example of the use of sheet metal for interior decoration is found in the case of the Criminal Court Building on Schermerhorn Street, Brooklyn, N. Y., and which was formerly the Germania Club. In 1890 a sheet-metal ceiling was installed on the main floor of the club by Northrup, Coburn & Dodge Company, 43 Cherry Street, New York, and when the building was made over into a court house with numerous partitions it was necessary to remove the old sheet-metal ceiling and install new work in the various rooms. When the old ceiling was removed it was found to be in excellent condition after twenty-six years of service



Fig. 11—An Excellent Example of Sheet Metal as Used for Interior Decoration

and the company attributed much of the durability of it to the original priming paint which was used. In Fig. 11 of the illustrations we show a portion of the new ceiling of one of the rooms in the court house, the architect, Frank H. Quimby, 99 Nassau Street, New York City, stating that the work is one of the most satisfactory jobs of ceilings he has ever seen.

The Slate Roofer

A little work which cannot fail to prove both timely and interesting to architects, builders, roofers, quarrymen and dealers is the ninety-six-page publication, describing the kinds of slate in the United States, the buildings for which they are particularly adapted, the comparative sizes of slate, rules for measuring slate roofs, together with directions for laying slate and felt, which is being sent out by the Auld & Conger Company, Department A, Cleveland, Ohio. In addition there are designs for ornamental work, a statement as to the nails required for a "square" of roofing, rules and information which will be appreciated by those just entering the roofing business, etc. A series of tables, occupying nearly one-half the book, gives the number of pieces of slate in any number of feet or squares and is intended more particularly for roofers

(*Continued on page* 100)

Wright Wire Lath

The passing of the mortar through the meshes. This photograph of plaster actually applied upon Wright Wire Lathing shows the splendid key which it forms on the backside completely protecting the wires against corrosion. When properly applied the plaster will not come off.

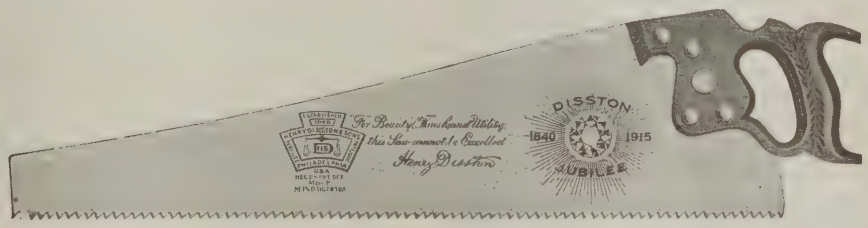
Wright Wire Lathing is made of cold drawn steel wire. Strongly reinforced with ribs that prevent all sagging. It is as well adapted to the modest home as the biggest building. Made in three finishes—plain, japanned or galvanized.

Send for our Catalog X, and see how you can use Wright Wire Lath.

Wright Wire Company
Worcester Mass.

A Good Mechanic Can Do a Job With Any Tool, But—

—not so well—not so quickly—not so easily as he can with a good tool

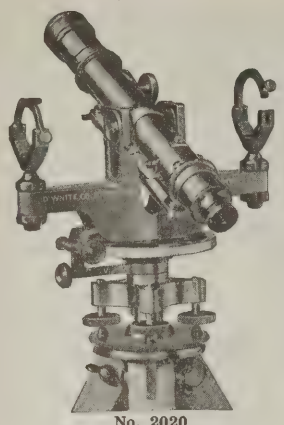


DISSTON SAWS

are the saws for the good mechanic because a skilled mechanic takes a pride in his work and in his tools. It's a satisfaction to own and work with a Disston Saw.

Booklet of Sharpening Instructions, Free

HENRY DISSTON & SONS, Inc., Philadelphia, U.S.A.

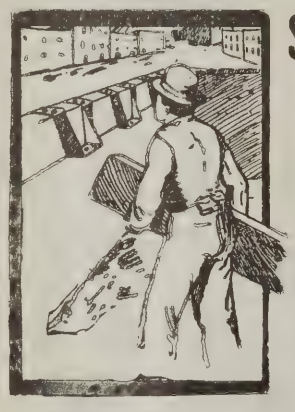


No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

A Free Book
—on Concrete Machinery

Porches
Vases
Chimneys
Flower Boxes
Building Blocks
Fence Posts
Drain Tile
Sewer Pipe
and Others

Not exactly a catalog because it gives the cost of making many concrete products — Blocks, Bricks, Porches, Chimneys, etc. Also tells about the profits in making Drain Tile for farmers; describes the advantages of farm drainage, etc.

GET this book if you are interested in concrete. Contains a lot of valuable information and interesting reading. Sent free upon receipt of a postal card.



W. E. Dunn Mfg. Co.
416 24th Street, Holland, Mich.

1/3 SAVED Buy Direct From MANUFACTURER



FREE BOOK

Do Your Own Plumbing and Heating NEW HARDIN EASY WAY



Get our "Handy-Man" Free Book. Every home needs it. Shows new home improvements and everything in **plumbing and heating supplies** EXCLUSIVELY at wholesale prices—complete heating plants, bathroom outfits, sinks, pipe, fittings, water systems, lighting plants, etc. **Any handy man** can install our goods with this free book and free easy installing plans. $500,000 plants behind our guarantee. **WRITE TODAY.**

The Hardin-Lavin Co. 40 yrs. at 4538-48 Cottage Grove Ave. **Chicago**

and dealers in slate, as slate is always bought and sold by the "square" or square foot. Some comments in regard to setting slate blackboards are among the other interesting features of this little work which has been compiled by D. Auld, Jr. The price is 50 cents.

American Saw Mill Machinery Company Removes Sales Department to New York City

Believing that it will be in better touch with the markets of the world both in selling and purchasing, the American Saw Mill Machinery Company has removed its Sales and Purchasing Departments from Hackettstown, N. J., to 50 Church Street, New York City. The company has had an office at this address for a number of years, handling its eastern and foreign business, and now additional space has been secured and a fine suite of offices especially arranged for promptly meeting the demands of its trade. Customers visiting New York City are cordially invited by the company to make these offices their headquarters while in the city. The location is in the Hudson Terminal Building reached by all Hudson River tubes and convenient to elevated railways and subways.

The Latest Pullman Sash Construction

An improved form of sash construction embodying features which cannot fail to interest architects and builders generally has just been developed by the Pullman Mfg. Company, Rochester, N. Y., and an illustration of it is presented in Fig. 12. The idea is to secure a

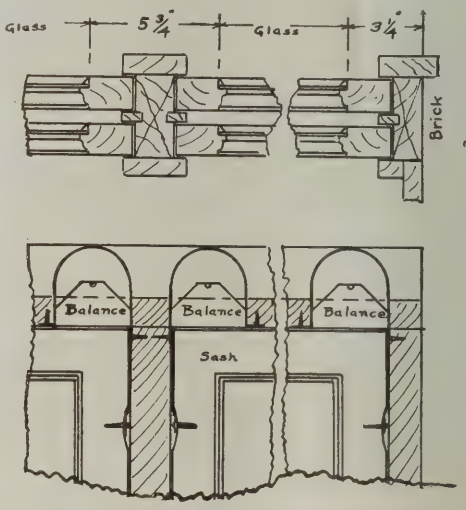


Fig. 12—Showing Details of Latest Pullman Sash Construction

maximum of glass area in a given opening and the plan evolved requires only 18 in. of wood for a group of three double-hung windows, all the rest being glass. This also includes the stiles of the sash. The frame is exceedingly simple, being constructed of 2 x 4's grooved for the parting strip. The inside and outside trim is also of the simplest possible construction and stops are entirely eliminated. The sash is controlled with the Pullman "Unit" top balancers. The illustration represents a partial elevation and horizontal cross-section of the improved construction.

Slate as a Roofing Material

There are many facts which should be familiar to all architects, contractors and owners of buildings regarding the coverings used for structures of all kinds, and one of the best known perhaps is slate—a natural product which embodies no mixture of any kind but is simply taken from its bed like granite, marble or coal. In addition, it has the peculiar characteristic of being split into thin sheets and then with dressed edges made ready for roofing purposes. As is well known, slate is exceedingly durable and in many instances where slate has been used upon a roof for more than one hundred years is still in good condition. The Genuine Bangor Roofing Slate has been produced for more than sixty

(*Continued on page* 102)

Summer Is Building Time

Soon there will be a demand in all localities for men to build new barns.

This call is welcomed by the contractor who uses *PORTER SERVICE*, since he knows he can build the new barn in double-quick time and guarantee a thoroughly modern and workmanlike job.

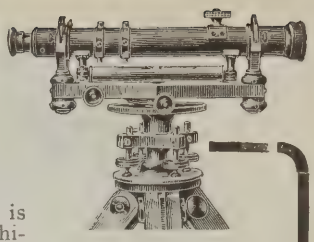
Consider what it means to receive authentic and practical data covering the construction, arrangement, ventilation, etc., of each *individual* barn. That's what *PORTER SERVICE* renders—and it's *FREE*.

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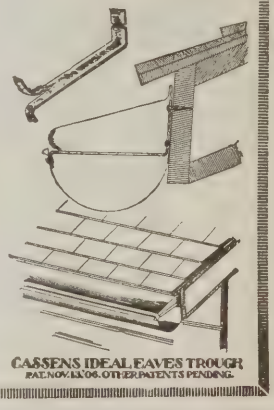
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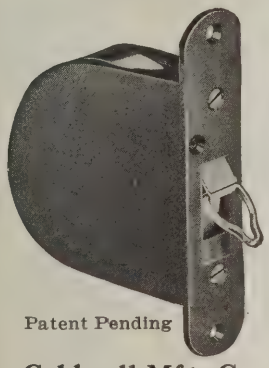
Have you seen it? If not we want you to try it. If "The Trough with the Lid" doesn't beat anything you have ever seen in the gutter line, tell us and you get your money back.

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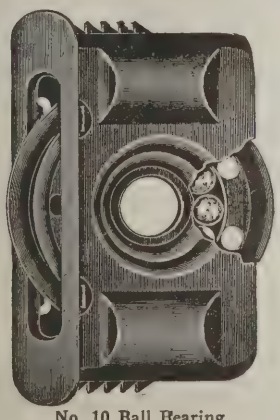


Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 3d galvanized No. 13 gauge 1¼ inch wire nails.
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Robbinsdale, Minnesota
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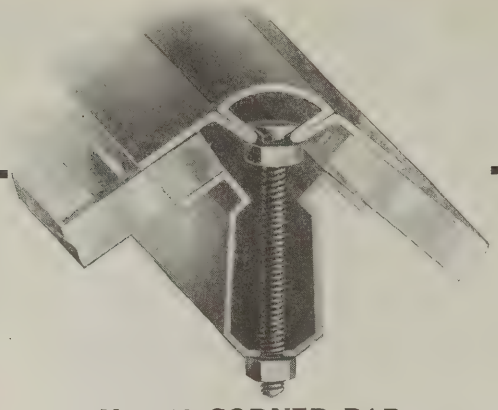
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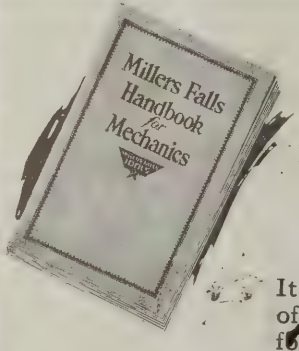
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Here are a few subjects:
Weight per foot of wood.
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105 River St., Millers Falls, Mass.

years, and the statement is made that the first slate manufactured in the oldest quarry is in good condition, having covered buildings for the period named. Experience has shown that slate properly applied to a roof is economical in the end and controverts the many statements which have been made in published articles relative to the excessive cost of slate roofs. A roof covered with slate is fire-resisting, is attractive in appearance and seldom calls for repairs. Bearing upon the subject is the literature which is being sent out by the East Bangor Consolidated Slate Co., East Bangor, Pa.

Standardizing Hollow Steel Doors

There are many features in a hollow steel door which make it superior to doors constructed of other materials, and in the past it has been necessary for them to be made to order, rendering their cost such as to prevent their being used in any but the more expensive buildings. This high cost has been such as to cause the Solar Metal Products Co., Columbus, Ohio, to make an effort to reduce it and to this end set about an analysis of several thousand jobs that had gone through its factory prior to 1915. As a result it discovered that most of the orders might have been standardized, thus eliminating the necessity of special attention and cost in each job for estimating, designing, dies, machinery, maintenance of drafting departments, etc., which would bring the cost low enough to justify their use in moderate priced buildings; furthermore making a better product possible. As stated in an attractive *brochure* entitled "A New Deal in Hollow Steel Doors," the company can now supply steel doors and trim at short notice, giving all necessary quotations on request. The doors have service and finish guaranteed. Details and specifications of Solar installations are compiled in convenient form in the "Architects' Solar Handbook," issued by the company.

Wire Chairs and Settees

Among the leading products of the Buffalo Wire Works Company, 446 Terrace, Buffalo, N. Y., is a line of wire chairs and settees which are of special interest

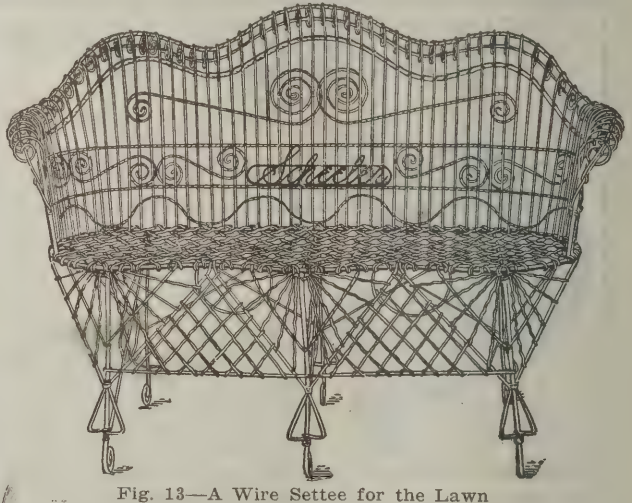


Fig. 13—A Wire Settee for the Lawn

just as the summer season is opening and when furniture of this kind is being placed on the lawns. The goods are constructed entirely of wrought iron and wire, the settees being well painted, after which they are baked, this giving a finish which, it is claimed, will not rub off. At a small additional expense the company will galvanize them if so desired, thus making them rustproof. In Fig. 13 of the illustrations we show a settee of this character of a size capable of seating two people. The length of the seat is 45 in. and the weight is 40 lb. The claim is made that these settees are much lighter, stronger, and more durable and ornamental than those made of wood.

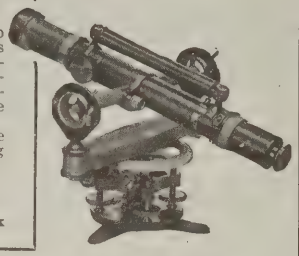
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(*Continued on page* 104)

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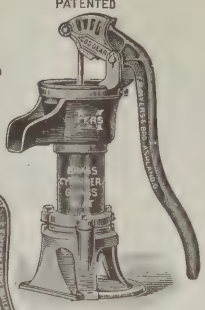
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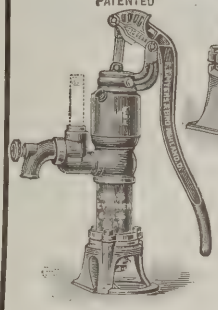




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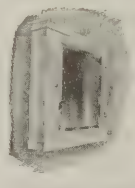
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Costs Less Than Wood

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The Most Dependable Wall Board in America

Contains no dirty, black materials, or cheap, punky, "jack-pine" fibers. Write for full information.

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Easy to lay

The all-mineral Composition floor material that is the standard from coast to coast. Sold only to builders and contractors under positive guarantee.

The best all-purpose sanitary floor in the world. Attractive profits. Write us to-day for SAMPLES.

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A little lighter in the eye and shank than our regular style but has the same quality and hang.

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For Suspending Heavy Doors Gates, Etc.

All of SUPERIOR QUALITY



CHAMPION METAL SASH CHAIN

ated, especially where it is desired to have an asphalt or slate shingle roof laid quickly. The new product, which is patented, is known as the Flex-A-Tile roll shingle, and we understand that a sample can be obtained by any architect or builder by writing to the Heppes Company, 1011 Kilbourne Avenue, Chicago, Ill.

TRADE NOTES

The Blue Valley Slate Manufacturing Company, with offices in the Behler Building, Slatington, Pa., has issued some interesting literature relating to roofing slate, blackboards, etc., copies of which can be obtained by any reader of the paper upon application to the address given. One of the folders sent out gives the size of slabs from 1 sq. ft. upward and intended for switchboards, etc. There are also prices of slate for electrical uses, sand finished on one face and edges. Reference is also made to slate slabs for structural, sanitary and other purposes.

An attractive pamphlet of sixteen pages setting forth the merits of Roberds' "Ideal" wall board is being sent out by the Roberds Manufacturing Company, Marion, Ind. In addition to much interesting information relative to this product, there are numerous halftone engravings representing interiors finished with the wall board in question. The company refers to its product as "the modern sanitary, fire-resisting, waterproof interior wall board."

A single-register furnace which embodies features of construction that are likely to appeal to architects and builders because of its low initial cost, ease of installation and all-round efficiency as a heater for a house of ordinary size is the Stewart, made by Fuller & Warren, Jackson Street, Troy, N. Y., and 260 Water Street, New York City. This construction is said to be especially desirable for heating cottages, stores, churches, residences, etc.

The Oak Flooring Service Bureau, 1349 Conway Building, Chicago, Ill., has been distributing among those likely to be interested an attractive folder relating to oak flooring. Reference is made to the beauty of these floors as well as to their wearing qualities, also to the fact that an oak floor properly laid greatly increases the renting and selling value of a dwelling.

Information of interest to the builder whose business warrants the expenditure for a motor truck is contained in the April issue of *Traffic News*, the house organ of the Federal Motor Truck Co., Detroit, Mich. It is stated that many Federal trucks are in use in the United States Army, a Model K, No. 2780 having recently been attached to the Post Exchange, at Fort Oglethorpe.

Lobb, Parry & Co., of which Ernest Lobb is manager, National Building, Daniellsville, Pa., are directing attention to their line of roofing slate for blackboards and structural purposes. A great variety of slate products is produced, and builders and roofers can obtain copies of interesting circulars on application.

An illustrated folder sent out by the Yaeger Machine Company, 216 West Rich Street, Columbus, Ohio, presents nine reasons why the building-contractor should decide on using the "Yaeger" spouting plant. The plant, it may be stated, consists of the Yaeger "Big-an'-Litle" mixer with loaded and auxiliary hoist of 5 hp. engine and mixer drum of 5 to 6 cu. ft. capacity.



The Building Age

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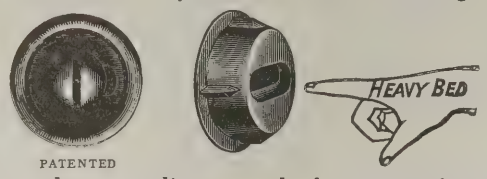
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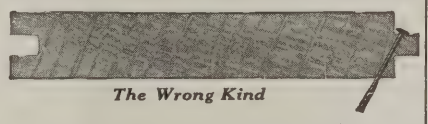
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Walls finished with Cabot's Old Virginia White
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Makes houses warmer in winter and cooler in summer. The U. S. Bureau of Standards' tests proved it the most efficient heat insulator, even better than cork board. As a sound-deadener it is equally efficient.

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The Spots on the Cord, in any color, are our trade mark, used only with this extra quality.

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Boston, Mass.

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Sewer Pipe
and Others

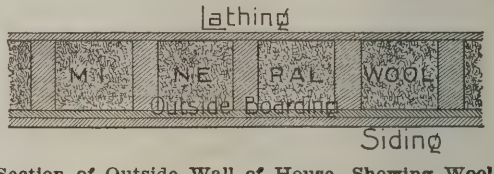
Not exactly a catalog because it gives the cost of making many concrete products — Blocks, Bricks, Porches, Chimneys, etc. Also tells about the profits in making Drain Tile for farmers; describes the advantages of farm drainage, etc.

GET this book if you are interested in concrete. Contains a lot of valuable information and interesting reading. Sent free upon receipt of a postal card.



W. E. Dunn Mfg. Co.

416 24th Street, Holland, Mich.



Section of Outside Wall of House, Showing Wool Between Studding.

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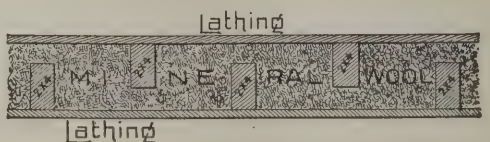
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Section of Sound-Proof and Fire-Proof Partition. Can be used for outside walls also.

The Building Age

NEW YORK, JULY, 1916

A Stucco-Coated Frame Residence

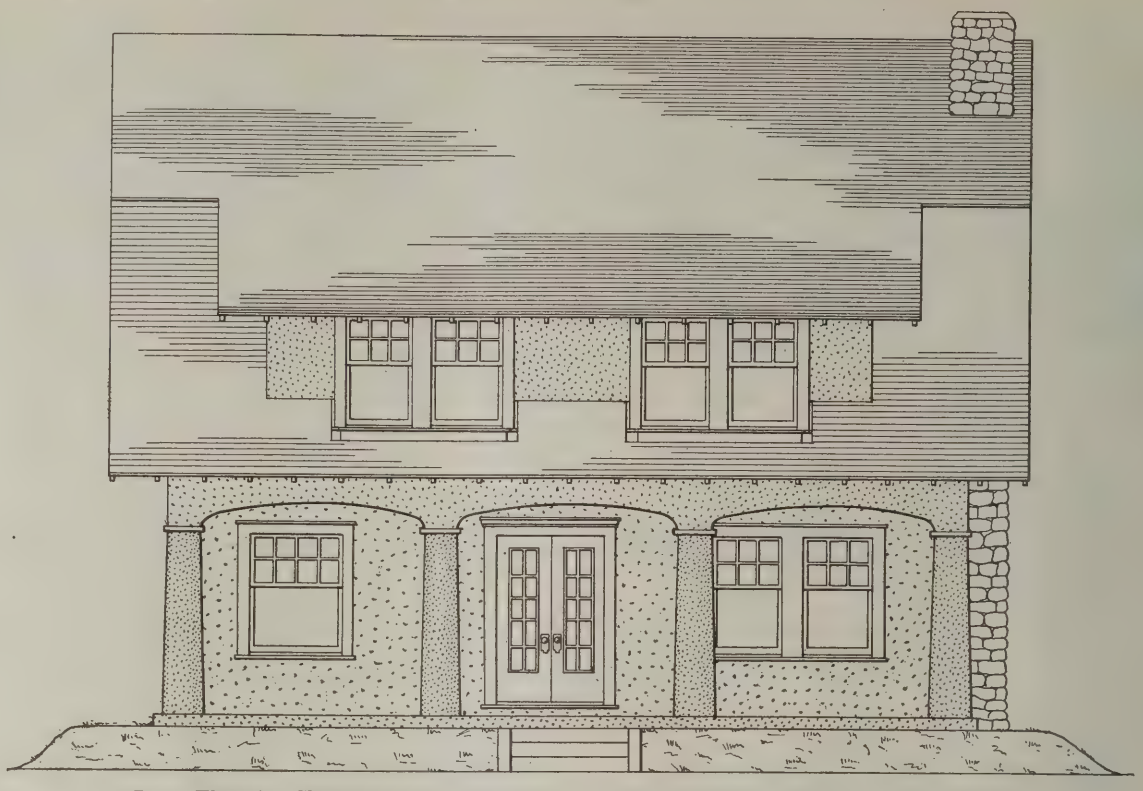
A Well Considered Plan to Meet the Requirements of a Physician—Details of Construction

THE design which forms the basis of the present article represents the home of a physician on Long Island, N. Y., and embodies features of arrangement of special interest to those having to do with the construction of dwellings of this nature. Noticeable features of the external treatment include the broad veranda, extending entirely across the front of the building, the massive columns supporting it, the gambrel roof with its protruding dormers, which break the roof surface and the outside chimney of cobblestones.

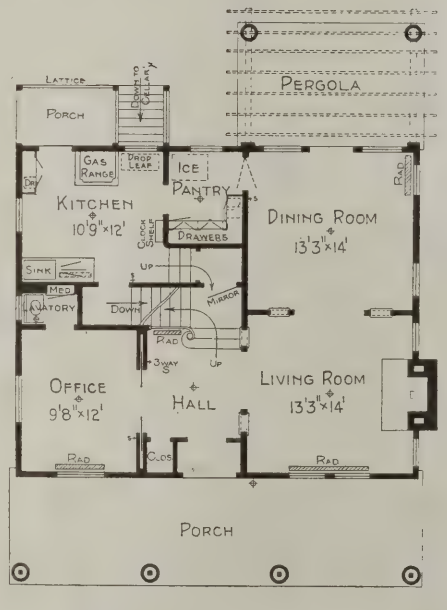


Residence of Dr. Ernest Goode at Bayside, Flushing, N. Y.—Architect, Geo. J. Hardway

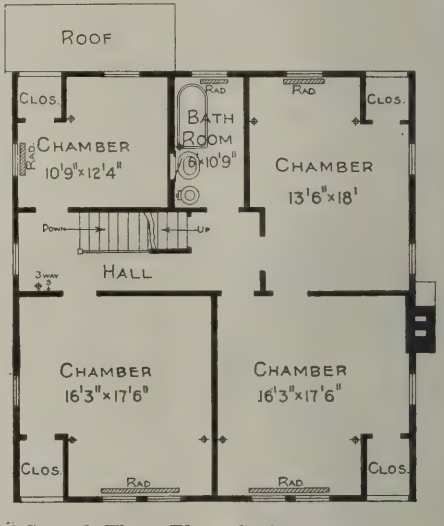
The floor plans presented on another page show a compact and well-considered arrangement. Entering the main hall through the vestibule one finds at the left and separated by folding doors the office of the physician-owner, measuring 8 ft. 8 in. x 12 ft. in size. Opening from it at the rear is a lavatory with a medicine cabinet and lighted by an outside window immediately over the washbasin. Just at the left of the vestibule door and opening from the main hall is a convenient clothes closet, which is also a receptacle for umbrellas, overshoes, etc. The main stairs rise from a point nearly midway of the house and land on the second floor near a window which affords ample light. The stairs are of the combination type, the flight from the



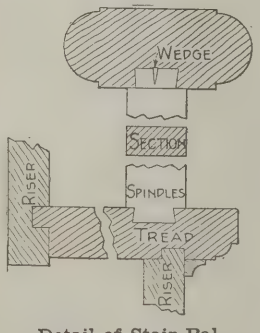
Front Elevation Showing Porch Construction and Main Entrance—Scale ⅛ In. to the Foot



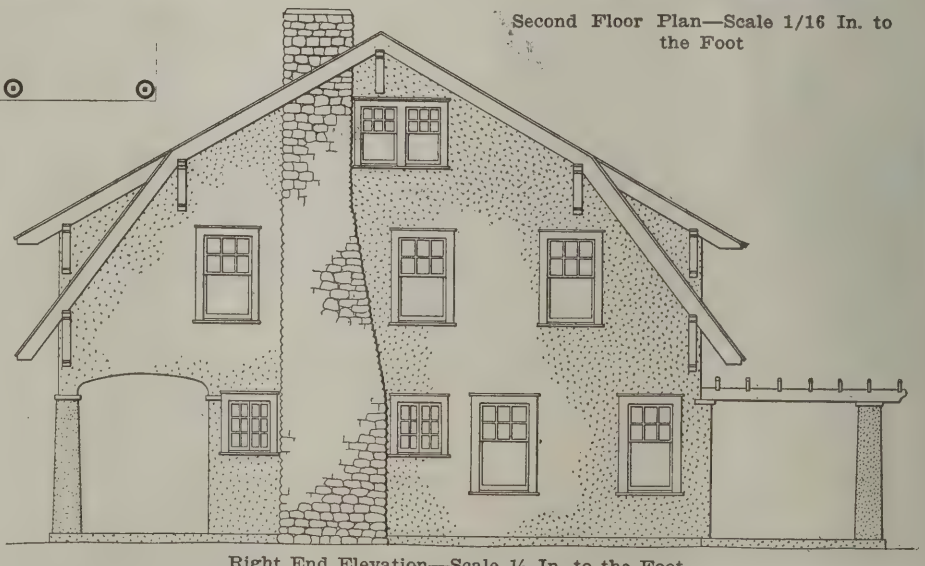
Main Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot



Detail of Stair Balustrade—Scale 3 in. to the Foot



Right End Elevation—Scale ⅛ In. to the Foot

A Stucco-Coated Frame Residence—Plans, Elevations and Stair Detail



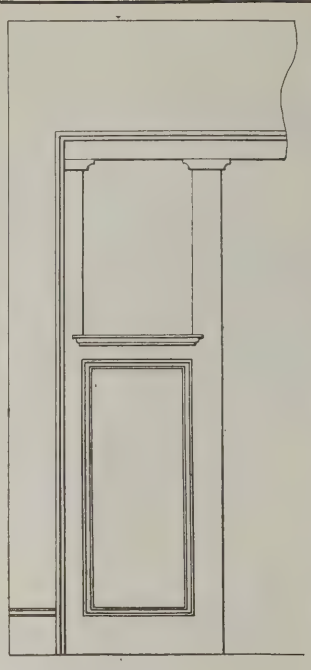
Living Room in the House of Dr. Goode Looking Across the Stair Hall into the Office at the Left and a View Through the Cased Opening into the Dining Room at the Right

kitchen to the landing consisting of three steps. This landing communicates with that of the main flight through a door carrying a full length mirror on the hall side. Beneath the main flight of stairs are those leading from the kitchen to the basement.

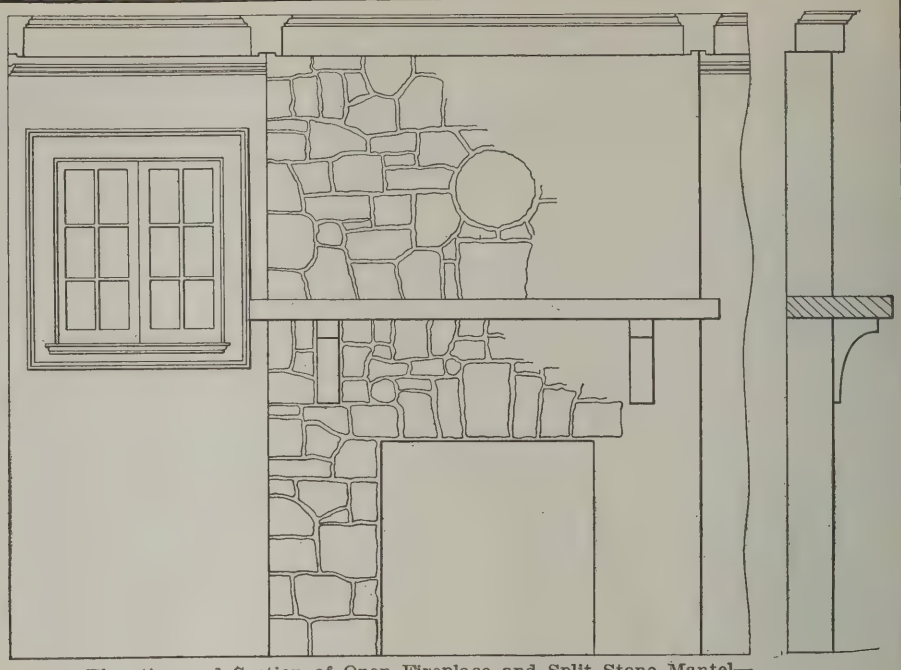
At the right of the main hall is the living room



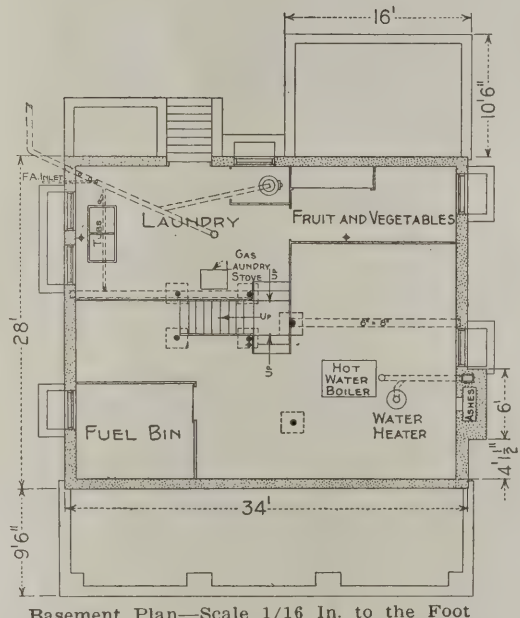
Living Room in House of Dr. Goode Looking Toward the Front Windows and Showing Wood-Burning Fireplace at the Extreme Left



Elevation of Portion of Cased Opening



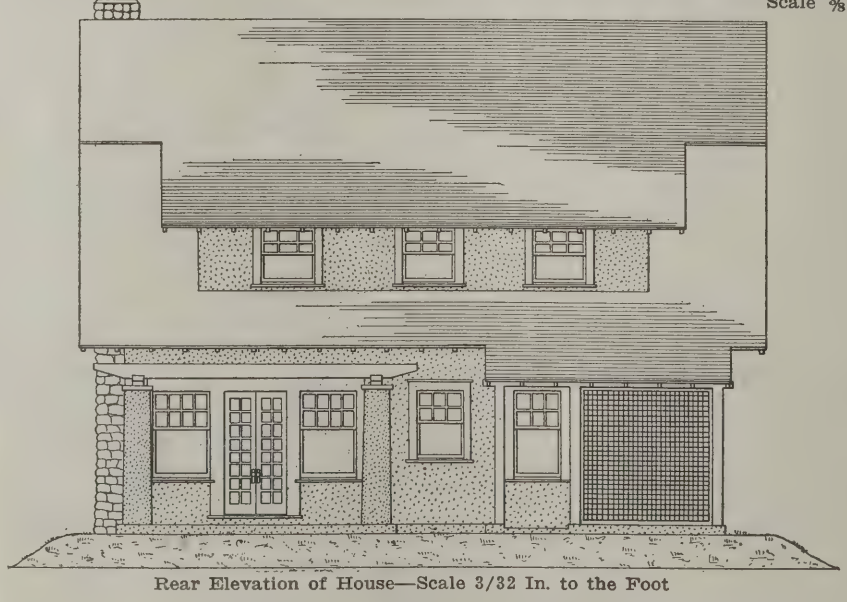
Elevation and Section of Open Fireplace and Split Stone Mantel—Scale ⅜ In. to the Foot



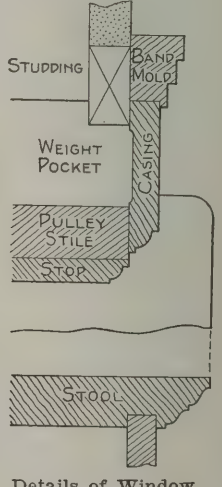
Basement Plan—Scale 1/16 In. to the Foot



Elevation of **Main Stairs Showing** Door Leading to the Rear Half of the Platform Landing Giving Access to the Kitchen. Scale ⅜ In. to the Foot



Rear Elevation of House—Scale 3/32 In. to the Foot



Details of Window Construction.
Scale 3 In. to the Foot

Miscellaneous Constructive Details of a Stucco-Coated Frame Residence

with its beam ceiling, the striking feature being the open fireplace built of split field stone with cement hearth. Beyond the living room and communicating with it through an open colonnade is the dining room, the walls of which are finished in slatted panels 6 ft. high, extending to the plate shelf. Communication between the dining room and kitchen is established through a well-equipped pantry lighted by an outside window. In one corner of the pantry near this window is the space for the refrigerator. The kitchen requires no chimney connection, owing to the fact that a gas range is used for cooking purposes.

On the second floor are four sleeping rooms and bathroom, this being so located as to result in an economy of installation of plumbing fixtures.

The foundation walls are of concrete mixed in the proportion of one part Portland cement to five parts coarse gravel and sharp grit sand.

The framing timbers are of spruce, the sills being 4 x 6 in. and the center beam or girder 6 x 8 in., all halved and spiked together on corners and joinings and supported on Acme columns with iron caps and bases.

The first and second floor joists are 2 x 10 in., and the third floor joists 2 x 8 in., all spaced 16 in. on centers. They are doubled under partitions and around openings for stairs, chimney, etc., using stirrup irons for headers and trimmers.

The studs are 2 x 4 in. spaced 16 in. on centers, tripled at corners and doubled around openings with truss over openings more than 4 ft. wide. The plates are 2 x 4 in. doubled and the rafters are 2 x 6 in. spaced 16 in. on centers and doubled around openings for dormers. The floor joists are stiffened with 1⅛ x 2 in. herringbone cross-bridging, and the frame of the house is diagonally braced with 2 x 4 in. stuff cut in between the studs. The floor joists of the porch decks are 2 x 8 in., also spaced 16 in. on centers.

The exterior frame of the building is covered with 8 x ⅞ in. matched and surfaced spruce boards laid diagonally, cut on the bevel on bearings and double-face nailed at each bearing. To the sheathing boards is fastened metal lath to which the cement stucco coating is applied. The roof rafters carry 1 x 2 in. shingle strips to which are nailed 16 in. cedar shingles exposed 5 in. to the weather on the sharp pitches and 4 in. to the weather on the flat pitches. The ridges are covered with shingles laid Boston style woven.



A Stucco-Coated Frame Residence—View in the Dining Room Looking Toward the Casement Doors Leading to the Pergola at the Rear

The porch columns are slatted up on circular forms covered with metal lath and finished in cement, painted white. The floors of the porches are of concrete laid on a cinder base and marked off in areas about 2 ft. square. The porch ceilings are laid with ½ x 2½ in. face cypress ceiling and finished with ⅞ x 2 in. mold at the intersections. The bedroom floors over the porches are thoroughly packed with mineral wool and made airtight.

The cellar, which extends under the entire building, has a floor of concrete 4 in. thick. In the cellar is located the laundry with a set of Alberene soapstone wash trays, 28 x 28 in., on galvanized iron stands, and a gas laundry stove. There is also space for the hot water boiler and the water heater, a fuel bin and a room for fruit and vegetables.

The chimney is of brick laid up in lime and ce-

ment mortar and with all exterior joints neatly struck. The exterior exposed surfaces are built up with cobblestones and all flues have terra cotta linings extending from the bottom to the top of the chimney. An idea of the appearance of the chimney may be obtained from inspection of one of the small halftone pictures near the end of this article.

All walls and ceilings of the rooms on the first and second floors are plastered with two coats of King's Windsor Cement mortar and finished with a white coat of King's Windsor Cement, all applied to spruce lath. The walls of both bathroom and kitchen are covered 5 ft. high with metal lath and plastered with King's Windsor Cement. The finish coat is of Keene's white cement laid off in the kitchen in imitation of 3 x 6 in. tile.

The window sash are 1⅜ in. white pine glazed with double strength American glass, balanced with weights and hung with Silver Lake cord over pulleys. French windows have 1¾ in. sash hinged at side and finished with bronzed butts and fastenings.

All outside finish, corner boards, casings, moldings, porch work, exposed rafters and hanging rafter pergola are of cypress.

The floors of the kitchen and pantry are ⅞ x 2½ in. matched maple flooring; those of the second story are of ⅞ x 2½ in. face edge grain North Carolina pine laid on a diagonal sub-floor, while the third story floors are of 3-in. North Carolina pine, blind nailed.

The balance of the first story floors are double, the sub-floors consisting of 6 x ⅞ in. surfaced spruce flooring, laid diagonally, and over which is laid parquetry flooring of oak.

The finish of the office, living room, dining room, hall and stairs is oak with a plain single member finish ⅞ x 4¾ in., terminating with a molded cap. The treads of the stairs are 1⅛ in. thick, with molded nosings, and the risers are ⅞ in. thick. The strings are 1⅛ in. and all are housed together, thoroughly wedged, blocked and glued.

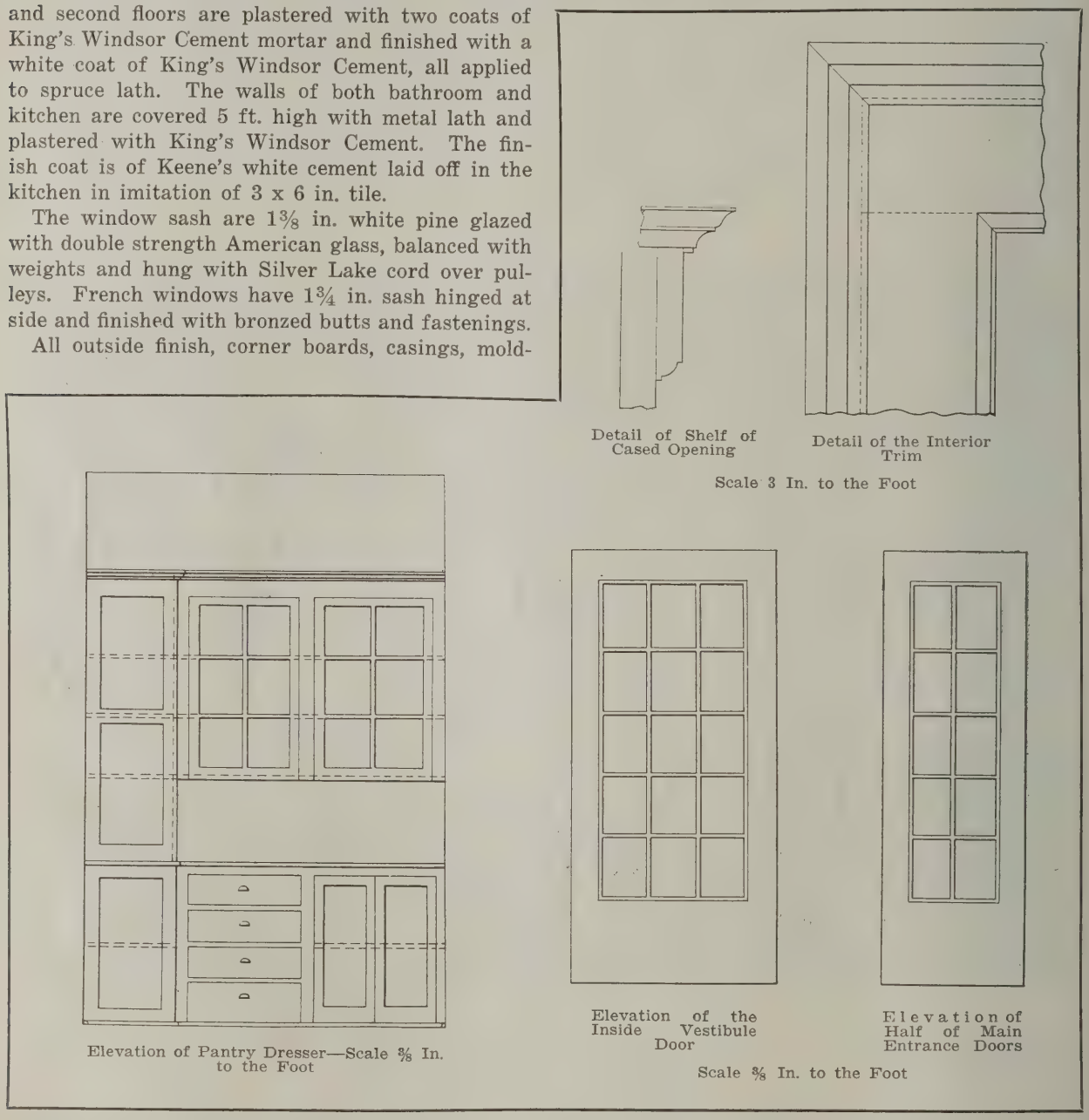
The balance of the finish is No. 1 whitewood of the same design and the doors are of birch. The finish in the kitchen and the third story is cypress.

The doors throughout are of the five cross-panel variety, and are 1⅜ in. thick.

The soffits of all overhanging eaves are ceiled with cypress ceiling.

The side walls of the bathroom are covered with 6-in. glazed tile, with sanitary cove, while the floor is laid with 1⅛-in. vitreous octagon tile. The bathroom equipment consists of an enameled iron lavatory, 22 x 33 in. in size, and resting on an oval pedestal, a 5½-ft. roll rim enameled tub with nickel-plated fittings, and a vitreous china syphon closet of Standard make.

On the third floor is a service lavatory, 22 x 22



Miscellaneous Constructive Details of a Stucco-Coated Frame Residence

in. in size, of enameled iron. In the kitchen is a 20 x 30-in. enameled iron flat rim sink with compression faucets and nickel-plated strainer. In the basement is a wash-down water closet, and in the laundry is a 16 x 16 x 6 in. cast iron slop sink, with strainer and cast iron trap.

All interior oak finish was given a Flemish stain,



A Stucco-Coated Frame Residence—End View Showing the Outside Cobblestone Chimney

while all interior cypress received one coat of shellac and two coats of varnish. All interior whitewood finish was given four coats of flat white one-half zinc and one-half Atlantic white lead finish. The white cement tile of the bathroom and kitchen were given two coats of "Superior White Enamel," over one coat of flat white "Jap-a-lac." All woodwork in the basement received two coats of lead and oil paint.

All exterior woodwork not otherwise specified received two coats of lead and oil paint after the priming coat. The ceilings of the porches were finished with a coat of bleached shellac and two coats of exterior varnish. The shingles of the roof were dipped 10 in. in Cabot's shingle stain before being laid, and they were given a brush coat when the house was finished. The stucco finish received two coats of Cabot's stucco stain. All tin and iron work was given two coats of lead and oil paint after the priming coat.

The house is piped for gas and wired for electric lights in accordance with the rules of the Board of Underwriters. In the lower hall are three way-switches to control upper hall and vice versa; also a switch in the kitchen to control one light in the basement and a switch to control one porch light. In the kitchen is a 4-point enunciator with drops indicating side door, rear door and upper hall; also a buzzer with push in the dining room floor.

The house is heated by a Richardson & Boynton hot water boiler of sufficient size to maintain a temperature of 70 deg. in zero weather. The pipes supplying the radiators upon the first floor run in the partitions and are covered with heavy asbestos.

The residence here shown is that of Dr. Ernest W. Goode, at Bayside, Flushing, N. Y., and was erected in accordance with plans and specifications prepared by George J. Hardway, architect, 347 Fifth Avenue, New York City, and the work of construction was carried out under his supervision.

Romanesque Architecture

In a lecture on "The Architecture of Portugal" delivered not long since before the London Architectural Association, W. H. Ward of the Royal Institute of British Architects pointed out that the earliest examples of Romanesque architecture are naturally found in the north, and consist of an exceedingly simple and rude type of churches of the eleventh and twelfth centuries, with rectangular naves and chancels and occasionally a northern porch. Among other things he said:

"After the foundation of the cathedral of Santiago de Compostella, which was probably modeled on S. Sernin at Toulouse, a more developed basilican plan, with a transept projecting beyond the aisles and apses on the east side of it, became established as the national type, varied in a few of the more important later Gothic churches, such as the cathedral of Lisbon, by a chevet with radiating chapels. An admirable example of the Romanesque style, though dating from quite the close of the twelfth century, is the old cathedral, or Se Ve Velha, at Coimbra, with its austere fortress-like exterior almost unpierced by windows and crowned by battlements, and its long, dimly lit nave, culminating in the glory of an apse rich in carving and gilding. All the light comes from the high west window and two in the domical lantern at the intersection, which, externally, is still clothed with a mosaic of self-colored tiles. Internally, the aisle walls retain the patterned tile lining which has been stripped from the piers during a recent 'restoration.' The piers have half-round engaged shafts with capitals of Byzantine character. There is no clerestory, and the barrel vault of the nave is buttressed by half-barrel vaults over the quadripartite aisle vaults.



The Fireplace and Seat at the End of the Living Room

The three apses of the old cathedral are enriched with alter-pieces, probably the work of a colony of Flemish artists, who were employed by Manoel the Fortunate. The central one is in wood, and consists of exuberant Late Gothic canopy work gilded on a blue ground. Those in the side apses are of stone, and of the Early Renaissance, executed by Flemings or Frenchmen. The beautiful font near the west

end appears to be the work of Jean de Rouen—a Frenchman who came to Portugal about 1521, after having worked upon the monument of Cardinal of Amboise at Rouen.

"The transition from Romanesque to Gothic has its finest example in Portugal—as it has in London—in a church of the Knights Templars. This circular, or, rather polygonal, church at Thomar was built about 1165, and therefore probably earlier than the still fully-round-arched cathedral at Coimbra. The most important building of Early Pointed architecture in Portugal is contemporary with the last two. This is the great Cistercian Abbey Church at Alcobaça, founded in 1165, and finished 1211, and begun at least by Frenchmen.

"The influence of Northern Gothic was for a long time very slight in Portugal, and the thirteenth century, which was such a splendid building age in northern Europe, was almost barren here. Most of the earlier Pointed buildings date only from the fourteenth century. To this period belong many of the beautiful cloisters which offer one of the great charms of Portuguese churches.

"The fine church of Sta Clara at Coimbra, now half-silted up by the floods of the Mondego, is another example of fourteenth century building, which, from its massiveness and simplicity, and the absence of tracery, looks as if it belonged to the thirteenth, or even the twelfth. Much, too, of the picturesque castle of Leiria and its beautiful ruined chapel was built in the fourteenth century by King Denis the Laborer, who earned his name by his unremitting efforts to reclaim large tracts of waste land and plant the sand dunes. One of the first symptoms of Portuguese Gothic getting abreast of that of other countries is to be found in two beautiful altar tombs at Alcobaça, made about 1390, almost certainly by foreign, and probably by French, craftsmen. They are the tombs of Dom Pedro I and his mistress, Inez de Castro, who was murdered in the garden near Coimbra."

Compressive Strength of Portland Cement Mortars and Concrete

A publication has just been issued by the Bureau of Standards, Department of Commerce, on the "Compressive Strength of Portland Cement Mortars and Concretes," which will be of interest to contractors and engineers, and, in fact, to all users of cement.

Concrete differs from most structural materials in that it is not manufactured at a mill or plant according to chemical formula, under the observation of skilled specialists, subject to rigid inspection and test and such control as to produce a uniformly homogeneous product; nor is the process of manufacture completed in a few hours or days, as in the case of steel products. Furthermore, concrete is made from materials obtained from sources differing widely in characteristics which affect its quality. The proportions of the ingredients, the amount of water used in mixing, the thoroughness of mixing, the manner of placing, the atmospheric temperature and humidity, exposure to sun, rain and wind, immersion in fresh or seat water, all affect the quality of the concrete.

All these matters are discussed in the Bureau's publication which contains the results of some 20,000 tests. The general effect of variation in the methods of preparing the concrete is shown, and suggestions are given as to the proper methods to follow to obtain the best quality of concrete.

Many users of cement believe that the strength of concrete is entirely dependent upon the quantity of cement used in the mixture. This is not true, as a mixture lean in cement but properly made may have much greater strength than a rich mixture improperly prepared.

While there are not a great many failures of concrete structure, the majority of those which do occur are due to careless methods of preparing and placing the concrete, or ignorance of the effect of variable treatment. Most of the concrete used in building construction work to-day is mixed with an excessive quantity of water which permits of economic transportation from the mixing plant to the forms by means of shutes and troughs, but this excess of water may result in reducing the strength 50 per cent or more from that which could be obtained by using a lesser quantity of water.

The paper states that certain generally accepted methods of testing aggregates and proportioning mixtures are incorrect and suggests methods of selecting concrete aggregates, proportioning the mixture, mixing, placing and curing.

Copies of the publication known as *Technologic* paper No. 58, may be obtained free upon request to the Bureau of Standards, Washington, D. C.

Implement Sheds for the Farm

An attractively covered and amply illustrated pamphlet on Implement Sheds, written by Prof. K. J. T. Ekblaw of the College of Agriculture of the University of Illinois, is the first of a series of Bulletins on farm buildings being prepared by construction engineers for the National Lumber Manufacturers' Association, the series of nine in all on various buildings about the farm being so prepared that they can be bound in a single volume if the farmer wishes to preserve them for future reference.

The publication on Implement Sheds, like the others which will follow it, goes deeply into the question of how to construct buildings for the farm of sufficient strength and durability to prove in the highest degree economical for the builder.

The author, in addition to his technical suggestions, lays down as a general proposition the advisability of painting the farm buildings, for preservation against weather, insects, or other destructive agencies, as well as to give the farm a prosperous appearance. He says also that an implement shed can be erected in such a manner as to be simple, artistic, and utilitarian. His pamphlet gives hints for the erection of open, simple, two-story and wide inclosed types. It is published by the National Lumber Manufacturers' Association, Chicago, Ill., and copies are sent free on request.

The Rotch traveling scholarship has been awarded to R. T. Walker, a Boston architect, who will receive $1,500 annually for two years to defray expenses of a tour abroad for the study of architecture. The test consisted of a design for a concert hall. A second prize of $75 was awarded to H. Moise.



Some Aspects of Modern Shingling*

The Professional Shingler and His Work—Handling the Shingles—Splitting of Wide Shingles

By Edward H. Crussell

WE have already stated that the professional shingler often prefers to get right on to the roof instead of working the first courses from a scaffold, and Fig. 15 is a photo showing one of these fellows just commencing his job. It will perhaps be noticed that he breaks open his bundles as he uses them, but that is only because he is expecting some help on the job, and each man will be paid for the bundles he lays.

There has been considerable discussion in the past regarding the speed of the professional shingler and the quality of his work, and while disclaiming any desire or intention to start an argument, the writer would yet like to be permitted to turn aside from the main subject long enough to say a few words upon this much-discussed topic. Let me begin by saying that I have nothing either to gain or lose in this matter, and that if I did not feel sure my readers (or at least those who are acquainted with my previous writings) would take my statements at face value I would sidestep this part of my subject altogether. It certainly would be foolish for any writer to risk whatever small reputation he might have for veracity and accuracy for no other purpose than the boosting of some nail-driving expert whose whereabouts is at present unknown and whose very name has been forgotten.

First, as to speed. I have seen two men on the same job—one a professional shingler, the other a carpenter—each put on 8,000 shingles in ten hours. This is the best performance I have seen, but I know positively that it is nothing like a record, and can be and frequently is beaten. The shingles were of redwood, fastened with 3d common nails. They were laid under my supervision, and the work had to be first class. Rows straight, two nails to every shingle, the joints broken at least 1 in., and all shingles split that were 8 in. or more in width.

There are many people who, never having seen the professional shingler at work, refuse to believe the stories of his speed and accomplishments. A favorite method of those who attempt to disprove the statements is to first figure how many nails are required to nail a certain number of shingles, and then, calculating one nail per second, prove by figures that "it can't be done."

The chief thing wrong with this method of argument is the fact that comparatively few people have any real idea of the length of one second and of what may be accomplished in that length of time by one who is really trying. Counting at ordinary talk-



Fig. 15—A Shingler Just Starting Work on a Roof



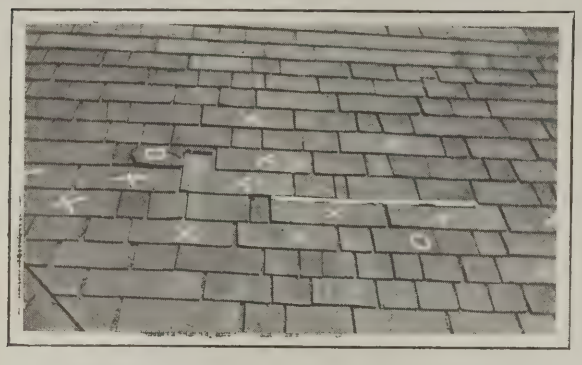
Fig. 16—Method of Holding the Shingles by the Workman

Some Aspects of Modern Shingling—The Professional Shingler

*Copyrighted, 1916, Edward H. Crussell.

ing speed it is easily possible to count one two three four, to the second and *anyone* who uses a hammer in his daily work ought to be able to strike light blows at least that fast—two blows to the nail and two nails to the second.

Another argument offered is that the professional's work is not fully nailed, one nail to two



Some Aspects of Modern Shingling—Fig. 17—Showing That Wide Shingles Do Not Always Split After Laying

shingles, and so forth. Nailing is the least of the professional's worries; he carries his nails in his mouth and has an educated tongue, with which he can push two nails at a time, point foremost, from between his lips as fast as he is able to drive them. He has practised this so often and does it so automatically that if for any purpose he needs an extra nail you will always find him using two.

This is not exaggeration, but a sober fact. The entire process of bringing two nails from the mouth and driving them with four successive blows of the hatchet is such a mechanical one that if he should drive one nail into a shingle and then drop the other instead of reaching for one nail, as you or I might, he takes the two already protruding from his lips and drives them with exactly the same motions as he would if the one nail was not already in place. Almost invariably the professional shingler's work is both faster and better than that of the carpenter, as any unprejudiced person would naturally expect it to be.

Now why have I gone aside to discuss this matter? Because if we approach the solving of any problem with an "It can't be done" attitude we have already invited failure, while if we can first get ourselves to believe that it *has* been done, and then assume that what one man has done another can do, the biggest portion of the problem is already solved. If therefore (this is for the younger readers) you wish to speed up your shingling abilities, commence by believing that what has been written concerning the professional shingler in the foregoing is true.

Let us return to our main subject and see if we can discover what advantages the fellow with a gauge on his hatchet, carrying six or seven courses at once, has over the fellow using one of the other methods. The first saving, of course, is in the lesser need of chalking the line. The next is in walking backward and forward across the roof. But the biggest saving of all and the one most frequently overlooked is the ease with which he is able to place his shingles and keep the joints broken. This is because he has as many places to lay any shingle as he is carrying courses, and it would be a queer shingle that would not fit in one of them. The man carrying a single course has only one place to lay his shingle, and if it doesn't fit he must exchange it for another or trim it to size.

For the actual handling of the shingles there are different methods used, even by the professionals. Some prefer to take the shingles one or two at a time from between the roof boards, selecting the correct width as they do so. Others take each small package from between the roof boards as they come to it and lay it across their lap, as in Fig. 16. In this latter method pressing the shingles edgewise against the thigh will discover the widest one, and this is laid on the bottom course, then the next widest is laid on the second course, and so on.

To keep the courses straight the far corner of the shingle about to be laid is gauged with the hatchet from the course below, while the near corner is kept in line with the shingle already laid in the same course.

The adjustment is made almost instantly and automatically, and the hatchet is then turned over so that the head of it rests on the shingle and holds it in place, while the left hand goes for nails. The outer edge of the left hand now rests on the shingle and holds it so that the hatchet may be lifted. Between the thumb and forefinger of this hand are held the two nails, a slight distance apart, the outer nail already over the place where it is to be driven; as soon as the first nail has been started the hand moves with the other nail to its appointed place. All the motions are as automatic and as certain as those of a piano player, and, as already stated, the two nails are driven with four blows of the hammer about as fast as you can count rat-tat—rat-tat.

No great difficulty is made of the splitting of wide shingles. The shingle is usually placed as if it was not to be split; two nails are driven into that half of it nearest the workman, the further edge is then lifted with the left hand and a tap with the hatchet splits the shingle. The second half is then moved over a little to make a joint and two more nails are driven into it.

The slight extra width made by splitting a shingle is sometimes taken advantage of and used

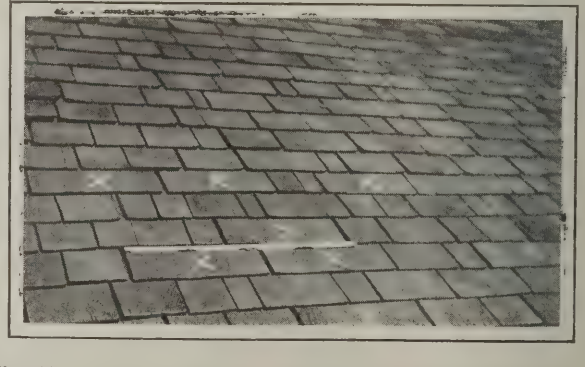


Fig. 18—Another Section of the Same Roof as That Shown in Fig. 17

for increasing the width so as to give a little more lap to the joint, when, had it not been for the extra width required the shingle would not have been split.

The splitting of wide shingles when laying them is an item that has received some consideration in the past. The idea seems to be that if they are not split when laid they will split afterward and may split directly over a joint and so cause a leak. That wide shingles do not always split after they are laid is pretty well proven by the photo Fig. 17.

The shingles in this picture had been on about five years when one day the roof caught fire from a defective flue. When repairing the roof the attention of the writer was drawn to the number of wide shingles in it and to the fact that apparently they had no more tendency to split than the narrow ones had.

Every shingle marked X in the photo is 12 in. or more in width, as may be proven by comparing them with the 2-ft. rule shown open on the roof, and not all of the wide shingles have been marked. The two shingles marked O had new fractures, proving that they had been broken either by the firemen or by the workman doing the repairing. The exposed portion of the one shown at the left consisted entirely of cross grain and knot, and this shingle should never have been laid. Fig. 18 shows another portion of the same roof, merely to prove that the wide shingles without splits were not confined to one small section of it.

Since seeing this roof the writer leans to the opinion that the chief advantage obtained by splitting the shingles is about the same as that gained by using narrow, rather than wide, flooring, viz.: more nails and the swelling and shrinking divided amongst a greater number of joints.

In those parts where there is a wet and a dry season, great care must be exercised in spacing the shingles. Those laid in the summer, when they are very dry, need to be spaced so that they may not swell tight and buckle up when the winter rains appear. On the other hand, those laid when they are very dry, need to be spaced so that they may not swell tight and buckle up when the winter rains appear. On the other hand, those laid when they are very wet, must be laid close and require judicious nailing in order that the long months of summer sunshine may not open up the roof and make it a sieve. Of course shingles, when perfectly dry, should not be laid close in any climate, but only those who have lived where the spring and fall rains are five months apart have any idea of how exceedingly dry shingles, and shingle roofs, may become.

(To be continued)

A Farm House for a Small Family

A Design Prepared to Meet Requirements of the Southern Climate—Sleeping Porch a Feature

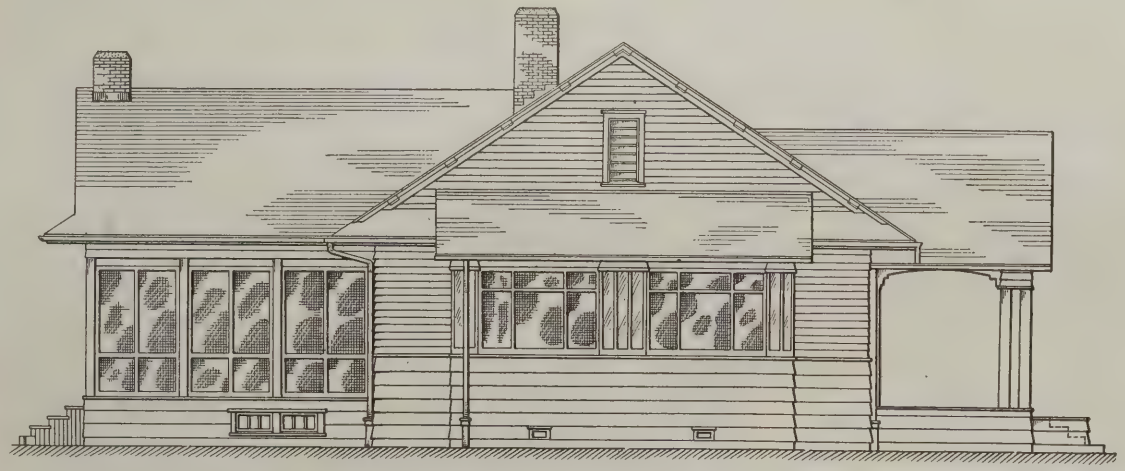
THE design of farm house here illustrated and described represents the results of extensive surveys in the South to determine the household needs of families with reference to local agriculture, climate and domestic help. The materials selected are those commonly used in that section of the country, and in the development of the plan the aim primarily was to provide, first, a cool and convenient kitchen and dining room; second, bedrooms and living room with the best exposure; third, facilities for outdoor sleeping, and fourth, an easily heated house—cool in summer and yet with sunny rooms in winter.



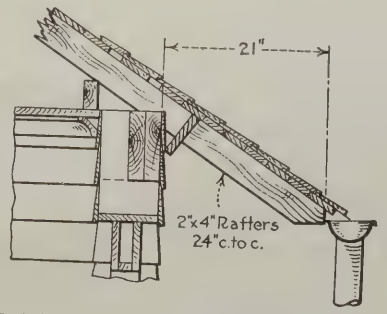
General View of a Southern Farm House Adapted to the Needs of a Small Family

The arrangement of the dining room and kitchen constitutes the chief feature of the plan, as in the case of a farm house these are two of the most important rooms. The dresser or china closet, as it may be termed, opens into both rooms and results in the saving of a great many steps between the two, owing to the fact that after meals dishes may be passed through on the wide counter shelf to the kitchen, where they are washed at the sink placed in close proximity and amply lighted by the double window, and then returned to the china closet where they are available from either side.

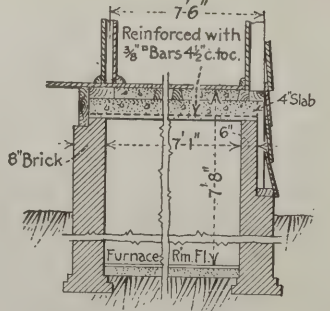
The kitchen is well lighted, conveniently arranged and comparatively cool as kitchens go, owing to the fact that the range for cooking is located in a separate room at the rear and the windows on opposite sides of the kitchen permit a cross-draft. In the ceiling of the cook room is a large opening which permits the heat and odors to escape through



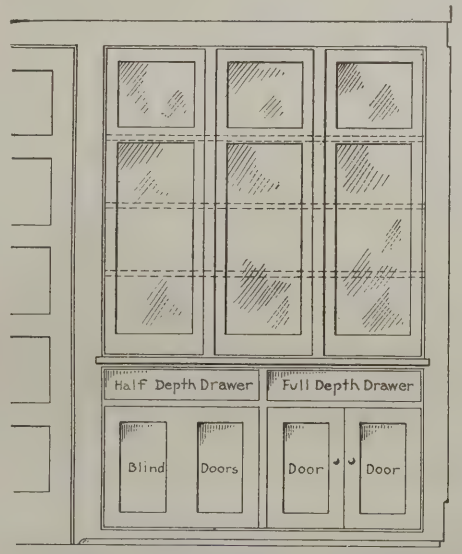
Left Side Elevation Showing Screened Porch at the Rear—Scale 3/32 In. to the Foot



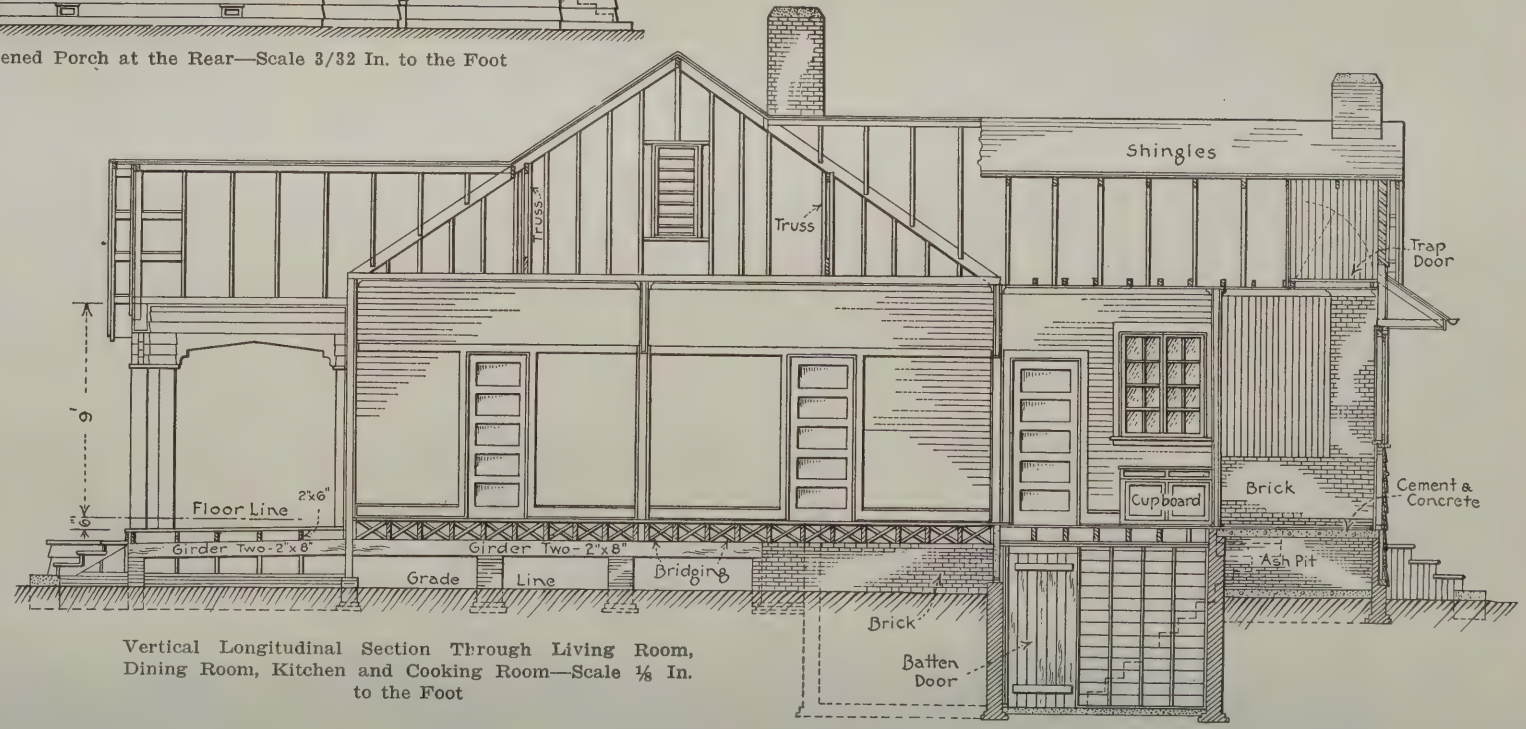
Detail of Main Entrance Cornice—Scale ½ In. to the Foot



Section Through the Furnace Room—Scale ⅛ In. to the Foot

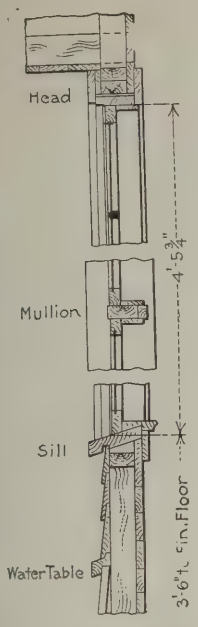


Elevation of Dresser in Dining Room—Scale ⅜ In. to the Foot

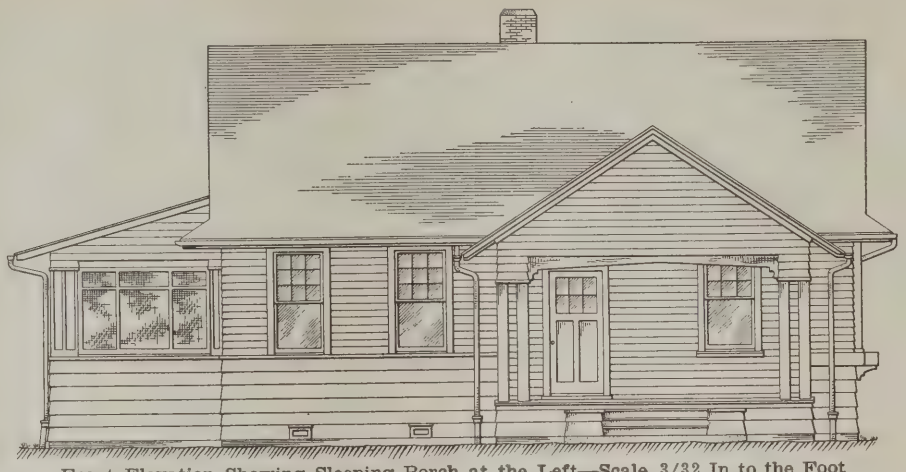


Vertical Longitudinal Section Through Living Room, Dining Room, Kitchen and Cooking Room—Scale ⅛ In. to the Foot

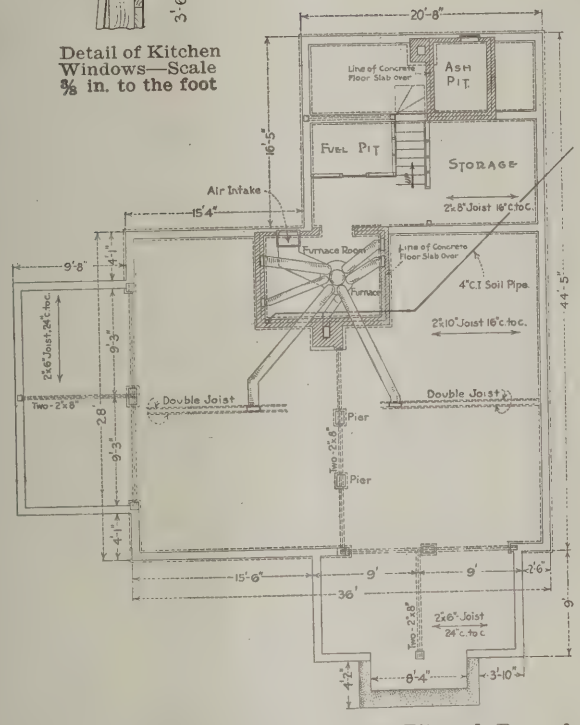
A Farm House for a Small Family—Elevation, Longitudinal Section and Miscellaneous Constructive Details



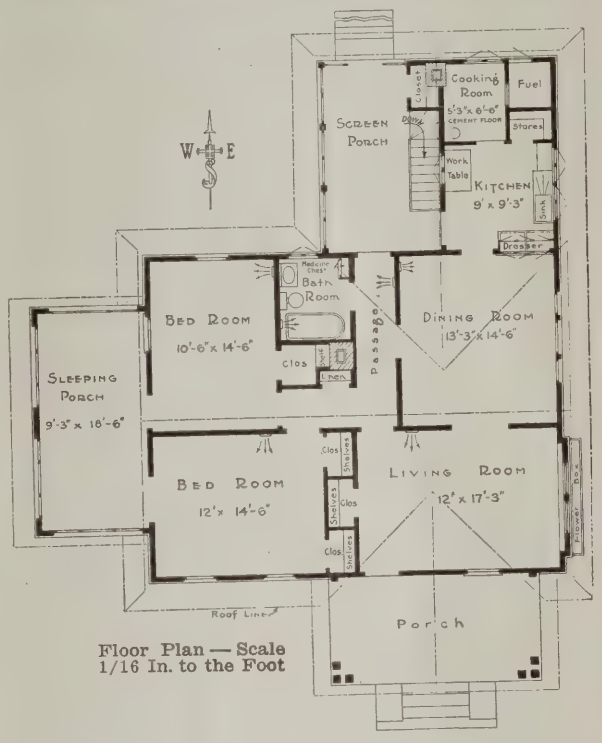
Detail of Kitchen Windows—Scale ⅜ in. to the foot



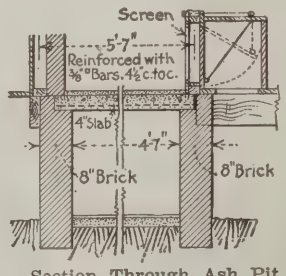
Front Elevation Showing Sleeping Porch at the Left—Scale 3/32 In to the Foot



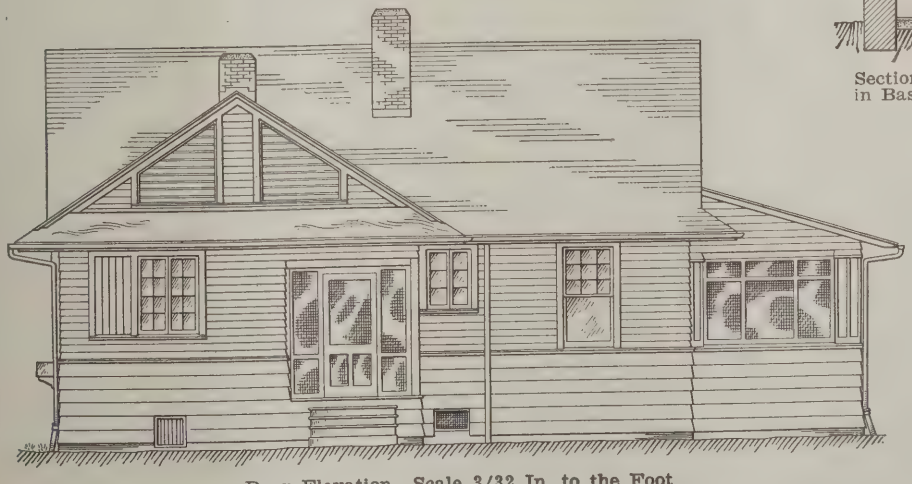
Foundation Plan Showing Furnace Pit and Run of Piping—Scale 1/16 In. to the Foot



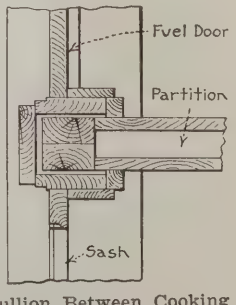
Floor Plan — Scale 1/16 In. to the Foot



Section Through Ash Pit in Basement—Scale ⅛ In. to the Foot



Rear Elevation—Scale 3/32 In. to the Foot



Mullion Between Cooking Room and Fuel Bin—Scale 1 In. to the Foot

A Farm House for a Small Family—Plans, Elevations and Miscellaneous Constructive Details

a ventilator in the gable. Near the stove, to give light and air, is a double casement window. A grated opening near the floor in the wall between the cook room and the kitchen closet draws air from below the floor and promotes circulation from the floor upward, thus helping to keep the lower part of the room cool. In winter when it is desired to keep the heat in the house the door between the cook room and the kitchen may be kept open and the ventilator and grate closed. The separate cooking room also insures a dining room which is cool and free from odors. The fuel room filled from outside is conveniently at hand, thus obviating carrying in fuel every day.

The living room occupies practically one-half the front of the house and is reached directly from the porch, no vestibule being considered necessary in the Southern climate. Communicating with the living room is a passageway leading directly to the screened porch at the rear. Opening from this passageway at the left are two sleeping rooms and bathroom. At the extreme left and opening out of both bedrooms is the sleeping porch, measuring 9 ft. 3 in. x 9 ft. 6 in.

The position of the bathroom is such that it is readily reached from all parts of the house, and at the same time is accessible from the screened porch without the necessity of passing through any other rooms. The closet opening off the screened porch is intended for rubber coats, boots, etc. As the house shown is designed to meet conditions prevailing in the South no provision was made for "washing up" by the farmhands, as they, as a rule, have their own quarters.

In the basement is located the furnace for heating purposes and the foundation plan clearly indicates the run of the pipes. The heater is placed in a pit beneath the bathroom, and the statement is made that the cost of installation would not greatly exceed that of two chimneys with two open fireplaces which would be necessary to heat all the rooms if open fireplaces were used for heating purposes. The pit is constructed of concrete and is made waterproof. Directly over the heater is a concrete floor slab.

The floor joists under the kitchen are 2 x 8 in. placed 16 in. on centers, while the floor joists for the other rooms are 2 x 10 in., also placed 16 in. on centers. The girder extending from the front wall of the house to the chimney base and supported on piers consists of two 2 x 8's. The joists are doubled under bearing partitions. The joists of the sleeping porch are 2 x 6 in., placed 24 in. on centers.

The exterior frame of the building is covered with clapboards laid 5 in. to the weather, while the 12-in. boards below the belt course are laid 8 in. to the weather. The shingles of the roof are laid 4½ in. to the weather.

This Southern farm house for a small family was designed by M. C. Betts, architect, and the plan was prepared in the Office of Public Roads and Rural Engineering of the United States Department of Agriculture.

The word "architect" is said by the London *Builder* to have first occurred in English in a book by John Shute, published in 1563.

Garages in Private Houses

Automobiles at popular prices and the necessity for housing them in the limited space available in more or less congested districts has caused a builder of Brooklyn, N. Y., to make an interesting innovation in connection with a row of ten attached private houses of brick construction which he is erecting. Instead of building the garages in the usual place at the back of the lot he has constructed them in the houses themselves. To enable him to do this, he left, at the rear of the lots, a ten-foot concrete paved driveway from which a driveway somewhat on the style of a railroad siding leads into the basement of each house, where a roomy reinforced concrete fireproofed compartment has been made for the automobile. This arrangement does not interfere with the laundry, heating plant, etc., and has the advantage of leaving a larger area of the yard available for garden purposes.

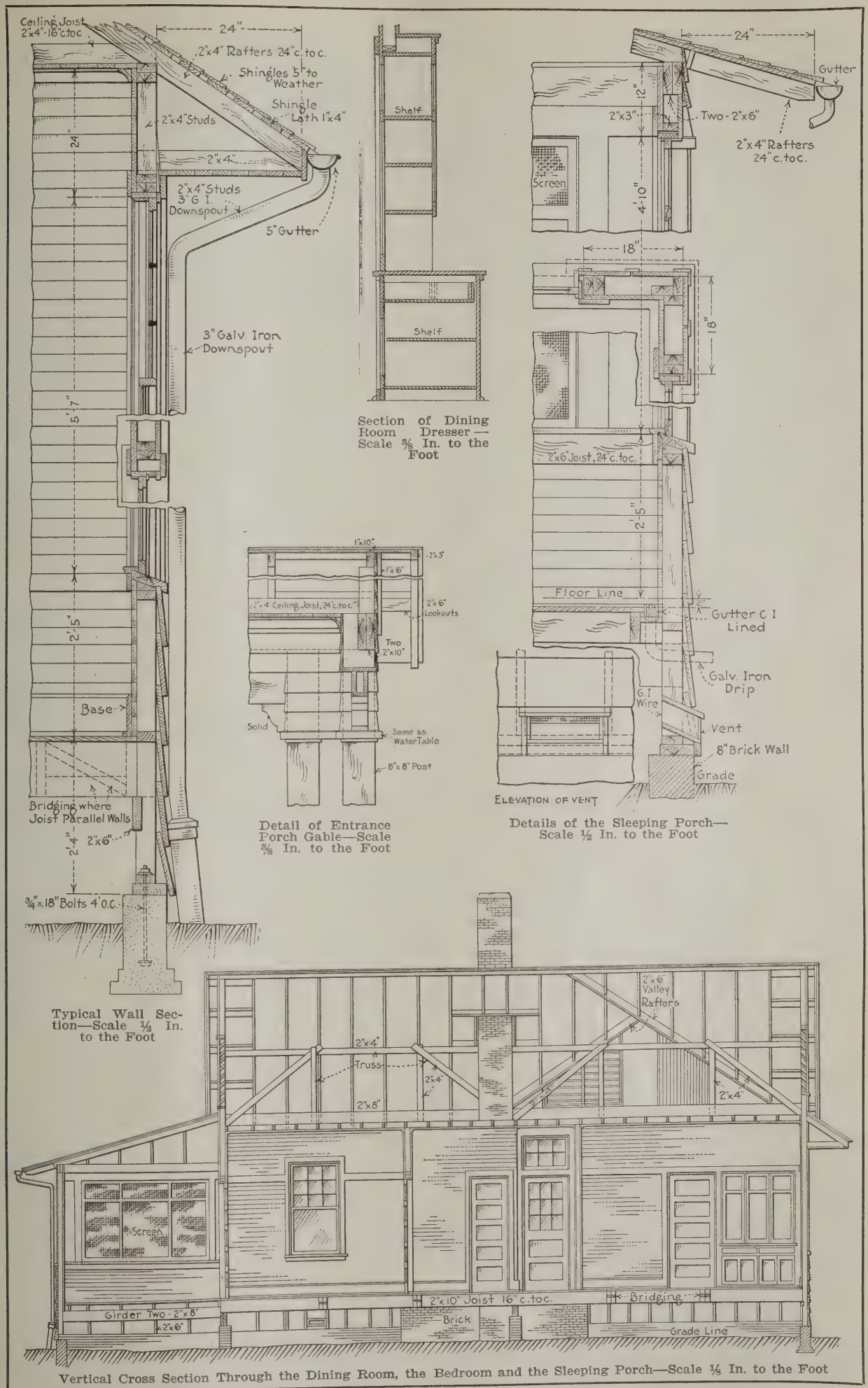
Production of Abrasives in 1915

The output of natural abrasive materials in 1915 was valued at $1,662,055, according to figures given out by the United States Geological Survey. Grindstones and like products valued at $648,479 were produced in Ohio, Michigan and West Virginia. Oilstones, hones, whetstones, scythestones and rubbing stones valued at $115,175 were produced in Arkansas, Indiana, Ohio, Kentucky and Pennsylvania. Emery to the value of $31,131 was produced in New York. Tripoli and rotten-stone were produced in Illinois, Missouri, Georgia and Pennsylvania, and diatomaceous earth was produced in California, Connecticut, Maryland, Massachusetts, Nevada, New Hampshire, New York, Oregon, Virginia and Washington. Pumice to the amount of 27,708 short tons, valued at $63,185, was produced in California, Kansas and Nebraska.

Keep Your Tools Sharp

This is old advice; every woodworker has heard it over and over again—he knows it by rote. But while this may be true, the fact remains that there are certain important lessons which human nature is slow to learn. One of these, and by no means the least, is that chosen for the topic of this article.

Several strong reasons may be urged to show why every self-respecting mechanic, especially the woodworker, should give diligent heed to this simple advice, says a writer in the *Wood-Worker*. First of all, a sharp tool, whether a bench or machine tool, does its work far better than a dull one. Every man who has had experience in handling tools at all knows perfectly well that much more and better work may be turned out by the use of a sharp chisel, a keen-edged plane iron or a well-filed saw than is otherwise possible. A chisel with a razor-like edge will cut its way through a piece of wood almost as easily as through a lump of cheese. In dressing a piece of lumber, a sharp plane does not scrape the surface, leaving it streaky and uneven to the touch (as is usually the case with a dull iron), but leaves the wood clean, smooth and silklike in appearance. If you take a saw in good trim it is simply amazing to see with what ease it eats its



Typical Wall Section—Scale 1/2 In. to the Foot

Miscellaneous Constructive Details of a Farm House for a Small Family

way through the lumber. In a word, it is a real pleasure to handle tools that do their work efficiently and well.

When kept in tiptop trim, the teeth of a band saw will eat their way through the wood, even if several inches thick, as easily as if passing through a piece of pasteboard. On the other hand, if the teeth be dull they will just scrape their way through, leaving behind a rough, ragged surface. A dull saw never can produce anything like a clean, smooth cut. To obtain the best results, therefore, in the least amount of time, it always pays to take the best care of one's tools.

The vast majority of mechanics are perfectly familiar with the truth here emphasized, yet every once in a while the expression is heard: "Oh, well, I can't afford the time to sharpen my tools. I must get this job off my hands as quickly as possible." And thus some continue to plod along in a bungling, slipshod fashion, making a botch of their work. Is it any wonder such mechanics are often dubbed "wood butchers?" The name is a most befitting one, because a decent job hardly ever leaves their hands. In the long run it would repay these reckless "butchers" to sacredly devote a share of their time to putting their tools in good cutting order.

Time spent at the grindstone or hone is by no means misspent. As a result their work would prove of far better quality, as well as passing through their hands in less time. In fact, I have found it true in my long years of experience that the difference between a good and poor mechanic is not altogether a matter of superior skill, but is due in part to the better care bestowed by the former on the tools with which he does his work.

The best mechanic I ever knew—a man who could turn out some of the finest work I ever laid eyes upon—was scrupulously careful to keep his cutting tools in first-class condition. He was fairly a crank on this matter; he would neither tolerate a dull tool on his bench, nor allow a fellow-workman to handle either his chisels or gouges. Consequently, when a piece of work was finished and left his bench, it invariably bore the stamp of a masterly hand. All of this goes to prove the importance of the lesson I am striving to impress.

New Building Ordinances of Los Angeles

During the past month or more important changes have been made in the building ordinances of Los Angeles, Cal., the Revision Commission, of which J. J. Backus is president, having recently completed its report after two years of work and filed a report of 70,000 words containing a draft of the proposed ordinance. The latter is intended to codify in comprehensive form and bring up to date the building regulations of the city. No radical departure has been made, as a rule, from the previous ordinance, such changes as are introduced being usually in the direction of economy and saving to the owner, in accordance with the results of experience in other large cities.

An important feature is the new section relating to the construction of hollow tile buildings, the new code permitting the use of hollow terra cotta tile for exterior walls in Class A, B or C buildings outside of certain fire districts, up to 50 ft. or four stories in height, except that party or bearing division walls may not be of hollow tile. One-story dwellings may be built anywhere with exterior walls of hollow tile, brick or reinforced concrete not less than 4 in. thick, 9 ft. high from floor to plate, with 4 ft. extra for gables; while two-story dwellings may have a 12-in. wall for the first story and a 6-in. wall for the second, of hollow tile, brick or concrete; certain restrictions on the method of construction being included. Hollow cement blocks are permitted in place of hollow tile.

The reinforced concrete section, the first work of the commission, was passed twenty months ago, and has effected a great saving of materials through the raising of the allowable stress on concrete, etc. A comprehensive ordinance relating to fire escapes, standpipes and automatic sprinklers, recommended by the commission earlier in its work, has given satisfaction, and both are included in the new code.

The structural steel and structural engineering provisions have been considerably elaborated and will be of great aid to architects and engineers. One important change is the requirement of fireproof sash and window frames within certain fire districts, which does away with fire shutters. Requirements for boiler room construction have been made more exacting, and general stairway requirements enlarged upon.

With the report a number of recommendations were submitted, to be codified later if approved by the Council.

New York Society of Architects

The New York Society of Architects held its annual convention on May 16 at the Engineering Societies Building in West Thirty-ninth Street, New York City, when officers for the ensuing year were elected as follows:

President .....James Riley Gordon
First Vice-Pres.....Adam E. Fisher
Second Vice-Pres.....Edward W. Loth
Secretary.....William T. Towner
Treasurer .....Oscar Lowinson
Financial Secy.....Ed. Wehrlin

The present membership is 340, of which nearly 200 were elected during the past year.

Building Operations in Chicago

The volume of building operations for which permits have been issued in Chicago as shown by the report of the city building department for the month of May is 73.45 per cent greater than the same month a year ago. There were 1207 permits issued, with an estimated cost of $13,707,100, as compared with 786 permits estimated to cost $7,902,900 in May, 1915. It is the largest May total in the history of the city.

For the five months of the year there has been an increase of 67 per cent, a surprising showing in view of the fact that the totals for 1915 were, with one exception, the largest ever enjoyed by the city.

The interesting as well as disturbing feature of the present year's operations is the fact that the bulk of the permits taken out are for apartment buildings, and furnishes conclusive evidence of the overbuilding being done in this field.



Suggestions for Door and Window Treatment—Main Entrance to a Chicago Apartment House

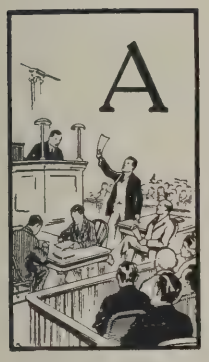


Some Designs of Modern Lighting Fixtures—Courtesy of the Macbeth-Evans Glass Company

Notable Recent Court Decisions

Determinations as to Architects' and Contractors' Right to Compensation—Time for Filing Lien Statement

By A. L. H. Street



AMONG the decisions lately announced by courts of last resort, I find several which hold peculiar interest for architects and builders on account of the common-fact situations presented in the cases adjudicated.

When an owner unjustifiably breaks his part of a building contract by preventing the contracting builder from completing performance, the contractor, if he remains ready and able to perform, may recover damages measured by the profits which he would have been able to have earned if he had been permitted to carry out the contract. So holds the California Supreme Court in the case of Connell vs. Higgins. The damages are to be computed according to the excess of the unpaid part of the contract price above the reasonable cost of completing that part of the work which he was prevented from performing.

Under a mechanic's lien statute, requiring a general contractor to file his notice of lien within sixty days following "completion" of the work, where work on a building is abandoned by mutual consent, notice of lien is filed in time by filing within sixty days after the cessation of work is agreed upon, according to the holding of the District Court of Appeal for California, in the case of Trimlett vs. De Coursey.

Skill Required of Architects

Rights of an architect to recover for professional services, as against objection by the employing owner that the services were negligently performed, were considered by the Supreme Court of Georgia in the case of Happ vs. Block. The court holds that, by accepting employment, an architect impliedly represents to his employer that he possesses sufficient taste, skill and ability to enable him to perform the required services at least ordinarily and reasonably well.

Plaintiff contracted with defendants to prepare plans and specifications for the erection of a four-story building, and to supervise its construction. Part of the agreed lump sum compensation for the work was paid in advance, and it was stipulated that the remainder would be paid on completion of the structure. After completion of the building, defendants accepted it and placed their tenant in possession, but, on it being subsequently ascertained that the basement was insufficient to resist seepage of water, defendants refused to pay the last installment due plaintiff. To his suit, brought to enforce payment, defendants interposed a plea that the defective condition of the basement was due to plaintiff's negligence and unskillfulness in preparing the plans and in supervising the construction, and further pleaded extra expense in remedying the defects. Under these facts, it was held by the Supreme Court that, defendants having accepted the building, plaintiff was entitled to sue to recover the balance of the unpaid compensation, subject to defendants' right to offset any damages resulting to them as a direct consequence of any negligence or unskillfulness on plaintiff's part, within the general rule above stated.

Effect of Trade Customs

It has become a well-settled rule of law, applicable to building contracts as well as agreements in general, that they will be interpreted in the light of general customs known to the parties, except so far as the express provisions of a contract are inconsistent with a custom invoked.

This rule is recognized in the case of New Jersey Terra Cotta Company vs. Traves, decided by the Michigan Supreme Court recently. In this suit the company was awarded recovery on defendant's bond as a building contractor for a balance due for architectural terra cotta sold him. The material proved to be satisfactory to the architect, and no objection was made to the manner in which it was used, but defendant counterclaimed damages on the ground that the material did not comply with the plans and specifications, with reference to which it was furnished. The terra cotta was used chiefly for cornice work, and it is claimed that the plans showed the size and shape of the terra cotta pieces, indicating a comparatively small number of large blocks, which could easily and inexpensively be placed in the walls, but that the material furnished by the company consisted of small blocks of such shape and number as to require extra labor in setting. Under these circumstances, the Supreme Court holds that it was not improper on the trial of the case to receive testimony of architects to show that it was a general custom in connection with contracts of this kind to send the plans to the terra cotta company, or other special material man, and have them adapt their construction to the architect's design, as shown by his plans, they furnishing the detail drawings and working plans, and that such course was followed in this case; that details and working plans were prepared by plaintiff terra cotta company, submitted to the architect, changed in some particulars, according to his directions, and finally approved by him before the terra cotta was made and shipped.

The architect's general plans for the building indicated, for use in the terra cotta cornice, longer and larger blocks than those actually used in the construction, showing them laid upon the wall so

as to project over both sides. But the architect testified that those places did not particularly show the construction—"more the design and size"—and that the indication of large blocks extending the full width was an error in drafting, as terra cotta work was not generally constructed in that way. In the construction, under the specific plans furnished by the company, the outward design and size of the cornice was the same as shown by the general plan, but smaller blocks were used, which did not project into the wall its full width, being braced and held by metal supports. The court concluded:

"Whether there was a custom, its nature and Traves' knowledge of it, and whether the parties contracted with reference to it, were questions opened to inquiry by the conflicting testimony, which fairly raised an issue for the jury. This was not precluded by the stipulation relative to plans, and the general plans furnished, for specifications also were equally binding, and details to be approved by the architect were required by the specifications. This is in harmony with the custom sought to be proved in explanation of the contract, rather than in exclusion of it."

Performance by Contractor

In the case of Giberson vs. Fink, the California District Court of Appeal decided several important rules, which apply to nearly every building contract. As to time of performance, it is held that if the agreement specifies no time the work must be completed within a reasonable time, and what is a reasonable time depends upon the circumstances under which the work is done in a particular instance. When a time is set for completing a five-room dwelling house, a delay of seven days in finishing the work will not be regarded as unreasonable. "Ordinarily, a provision in a building contract specifying a definite time within which the structure shall be completed is to be construed with reference to the building proper, and that it shall be at the end of such time in such condition as to be ready for occupancy," unless there is some clause in the contract excluding such interpretation. So the court holds that a slight delay in finishing a sidewalk included in a building contract is not a substantial breach on the builder's part where the building proper is ready for occupancy in due time.

As to deviations from the plans and specifications, the court decides that an owner estops himself to complain afterward of a change in location of the building on its lot, or the use of a different kind of material for the foundation from that called for by the contract, where he knows of the departures from the agreement at the time they are being made, and makes no complaint then. And the court further recognizes the just rule that the building cannot be rejected by the owner merely because of some slight omission, such as failure to construct cupboards in a kitchen, where they can be supplied readily without material alteration of the building. It is to be inferred, however, that the owner could demand a deduction from the agreed price to cover such omissions.

The Building Material Dealers' Credit Association is the name of an organization just incorporated at Dayton, Ohio, the purpose of which is stated to be "the exchange of ideas and the general benefit and protection that such bodies usually afford their members in the legitimate conduct of their business."

Primitive Doors and Windows in South Africa

A correspondent in South Africa writing to a recent issue of the *Illustrated Carpenter and Builder* of London, comments as follows on the subject indicated by the above title:

"Window blinds are comparatively unknown in the small villages in the Transvaal and Orange River Colony. This is due to the fact that the windows in the houses vary so much in size and shape that it would not pay to stock any average-sized blinds. Substitutes are used, very often of a very primitive character. In some instances this substitute takes the form of a blanket that is hung over the window. When the sun shifts round to the other side of the house in the afternoon the blanket is transferred accordingly. Amongst the farmers blinds are unknown, as are windows. There are openings, certainly, that can be closed up by closing the shutters, but there is no glass. The shutters are roughly made, and by no means air-tight, but as the Boer moves from one room to another, according to how the wind blows, he does not suffer from draughts.

"The making of these shutters helped the wheelwright and blacksmith, which callings, represented in a single person, were to be found in every agricultural center, to turn to advantage many an hour that would otherwise have been passed in idleness. As a general thing the 'guest room' was the only chamber to be first adorned with these shutters, the rest of the rooms still having to put up with the home-made articles, but by degrees the other rooms rose to the same dignity. The painter sometimes gets a night's shake-down and a shilling to help him on his road by giving the shutters a coat. Failing this, there is always something else for him to do that will tide him over the hours of darkness, for the Boer is fond of vivid coloring.

"The stranger who arrives at a Boer homestead and finds the shutters all up knows at once that there is trouble in the house and passes on. This trouble may not be of a serious nature; it may be that the *vrouw* has burned her hands in baking the bread, or the 'old man,' as the head of every Boer home is called, has a touch of the 'shakes,' a mysterious disease that has nothing to do with malaria, but, whatever the cause, the meaning is plain, and he who should ignore it would have but a chilly reception.

"The door of a Boer homestead is made in two halves. The origin of this is that when the Boers first came into the Transvaal they were subject to more or less constant attacks from the Kaffirs, and the half door was handy. The householder could rest his rifle on it and obtain fairly good cover whilst sniping at the enemy. Old customs live long, and the door 'cut in halves' is still to be met with on almost every farmhouse."

Aroba, a Cocobola Substitute

Aroba is the local and trade name of a West Indian timber which has recently been introduced into the American markets. It is said that the aroba tree occurs in great abundance in Cuba, Jamaica, Trinidad and parts of the Spanish Main and that the wood can easily be supplied in very large quantities. While the wood is employed to some extent in general carpentry work in Cuba and Jamaica, its use is for fence and telegraph posts.

Problems in Geometrical Drawing

Something the Progressive Carpenter and Builder Will Find Useful in Connection with Their Work

By W. S. Wilkin

WHAT here follows relates to a few problems in geometrical drawing together with polygon scales and a table of lengths per foot run for a rise of from 1 in. to 25 in., all of which I hope may prove interesting to readers of the paper. The sketches show how to use the tables in laying out work with the steel square. Fig. 1 shows an equilateral triangle, which may be laid out as follows. Let *a b* represent one side. Now with *b* as center and *a b* as radius, strike an arc at *c;* then with the same radius and *a* as center, strike another arc intersecting at *c*. Draw the lines *c b* and *c a* and the result is the triangle.

Fig. 2 shows how to draw one line parallel to another. Let *a b* represent the line, then with any radius and a center anywhere on the line *a b* as at *d*, draw the arc as shown; then with the same radius, and any point on the line *a b* and *c* as center, draw another arc. Now draw the line *e f* tangent to the arcs as shown and it will be parallel to *a b*. If the lines must be a given distance apart take that distance as a radius when drawing the arcs.

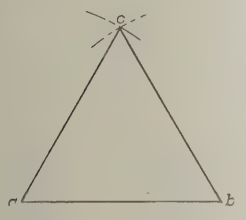


Fig. 1—Method of Laying Out an Equilateral Triangle

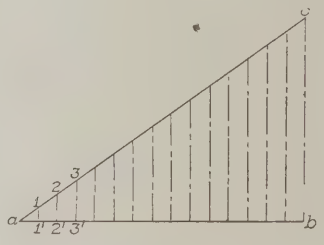


Fig. 3—Dividing a Line Into An Equal Number of Spaces

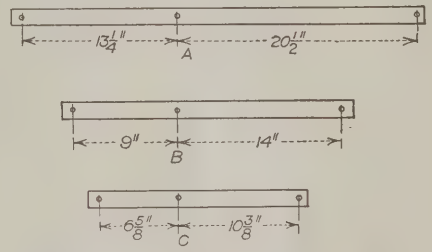


Fig. 4—A Problem in Proportion Solved by Means of the Steel Square

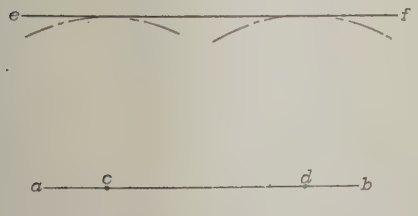


Fig. 2—Drawing One Line Parallel to Another

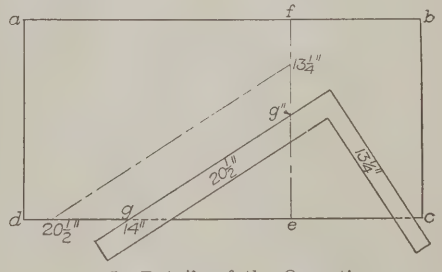


Fig 5—Details of the Operation

Problems in Geometrical Drawing—Interesting Solutions for the Builder

Fig. 3 shows a very simple problem, but one which comes in handy very often. Suppose we wish to divide the line *a b* into fifteen equal spaces without the use of the dividers. Draw the line *b c* perpendicular to *a b*, then take the rule or a rod 15 ft. long if the work is that large, place one end at *a* and bring it around until the fifteen-mark comes at *c*. Mark every inch or every two inches or every foot, according to whatever you are using, as 1, 2, 3, etc. Then draw the perpendicular lines from each of these points. As a result the line *a b* will be divided as shown at 1′, 2′, 3′, etc. In this way the divisions on the line *a c* may be taken from the line *a b* or whichever the case may be.

In Fig. 4 is represented a little problem in proportion done with the steel square. At *A* we have a beam or lever, as the case may be, with three holes in it as shown. Suppose we wish to make another one and to make the long end 14 in. as shown at *B* instead of 20½ in. as at *A*. Suppose also we wish to shorten the short end in proportion so as to have the same leverage. In Fig. 5 we show how to do it with the steel square.

Take a board as *a, b, c, d,* and have the edge *d c* straight. Draw a line square across it as *e f*. Now measure 14 in. from *e* to *g*, which represents the 14-in. end of the lever *B* of Fig. 4. Next take 20½ in. on the blade of the square which represents the long end of the lever *a* of Fig. 4 and 13¼ in. on the tongue which represents the short end of the lever *a*, and apply the square as shown in Fig. 5 so that the blade crosses the edge of the board at the 14-in. mark. Now mark the point where the blade crosses the line *e f* which is about 9 in. from *e* and represents the short end of the lever *B* of Fig. 4.

In order that the reader may more clearly grasp

the principle involved, I have measured on the edge of the board 20½ in. as shown, and on the line *e f* 13¼ in. from *e*, which represents both ends of the lever *A*. It will be seen that a line drawn from one of these points to the other is parallel with the blade of the square. It will be seen that:

e 20½ : *e* 14 :: *e* 13¼ : *e g*

This method is accurate, but, of course, a small drawing is not as accurate as it might be. It should be a little over 9 in.

Suppose now we wish to make another lever 17 in. between two outside holes, as shown at *C* of Fig. 4, and wish to make it in proportion to the lever *A*. We must locate the center hole, and to do this make *a b* 17 in. as in Fig. 6. Next draw *b c* perpendicular to *a b*. Take *a* as center and 33¾ in. as radius. This is the length of the lever *A*. Mark at *c*. Draw a line from *a* to *c*. Mark at *d* 20½ in. from *a;* then from *d* to *c* will be 13¼ in. Draw the line *d e* parallel to *c b* and *e* will be the point for the center hole, which makes the long end about 10⅜ in. and the short end about 6⅝, as at *C* Fig. 4.

In Fig. 7 is indicated a good method of drawing an egg-shaped oval. With *o* as center and radius equal to half the width of the required oval, draw the circle *a c b a*. Erect the perpendicular *o c* and draw the lines *a c e* and *b c d*. Now with *b* as center and *b a* as radius, draw the arc *a d*. Next with *a* as center and the same radius draw the arc *e b*. Again with *c* as center and *c d* as radius draw the arc *d e* which completes the oval.

In order to fully understand the steel square it is necessary to know something about geometry and geometrical drawing, and in this and another article I have, I think, explained enough to give the reader not already familiar with it a fair idea of lines, angles, etc.

The steel square is nothing more or less than a right triangle with the diagonal side left off to be put on by the user with the base and perpendicular —blade and tongue—marked off in inches, etc. The diagonal side is made either by placing little metal attachments, commonly called stair gages, on the blade and tongue, or by using a straight piece called fence, and hereafter I shall speak of it as a fence. By shifting the fence from one position to another on the blade and tongue we can make any right triangle imaginable, but we must know what figures to use in order to obtain the angle desired.

Herewith are presented three tables which I made several years ago, and have found them very handy at times. Tables No. 1 and No. 2 relate to polygon scales, while Table No. 3 gives the length per foot run for a rise from 1 in. to 25 in.

Table No. 1 is a polygon scale for butt joint for regular polygons from three to twelve sides, and according to it take 12 in. on the tongue and the blade will give the cut for five sides. The tongue gives the cut for all the rest. The columns marked "Sides" give the number of sides in the polygon. The next column marked "Central Angle" gives the number of degrees contained in each of the angles formed by drawing lines from the corners of the polygon to the center, as in Fig. 11. This diagram shows one-half of a pentagon, or five-sided figure. The central angle is 72 deg., which is found by dividing 360, the number of degrees in a circle, by the number of sides in the polygon.

In the third column headed "Blade" will be found the number to take on the blade with 12 on the tongue to give the angle for the butt joint, as shown in Fig. 8. The heel of the square must point toward the outside of the polygon for all except the triangle because for the sides of a triangle forming an acute angle the heel must be turned in.

Fig. 8 represents a hexagon which has six sides. Referring to Table No. 1 we find that for six sides we take 20 25/32 on the blade and 12 on the tongue and the tongue gives the cut for the butt joint, as shown in the drawing.

Now suppose we desire to cut pieces for a pentagon which has five sides, as in Fig. 11. In Table No. 1 we see that for five sides it gives 3 29/32 for the blade; taking this on the blade and 12 on the tongue, the table shows the blade gives the cut for

TABLE NO. 1—SHOWING POLYGON SCALE BUTT JOINT WHEREIN 12″ ON TONGUE AND BLADE GIVES CUT FOR FIVE SIDES AND THE TONGUE GIVES CUT FOR ALL THE REST

Sides	Central Angle	Blade
3	120°	20 25/32
4	90°	0
5	72°	3 29/32
6	60°	20 25/32
7	51°26′	15 3/32
8	45°	12
9	40°	10 1/16
10	36°	8 23/32
11	32°44′	7 23/32
12	30°	6 1/16

TABLE NO. 2—SHOWING POLYGON SCALE MITER JOINT; 12″ ON TONGUE AND BLADE GIVES CUT FOR OUTSIDE OR TO MITER PLATE, TONGUE GIVES CUT FOR INSIDE OR TO MITER RAFTER, EXCEPT LENGTH PER FOOT RUN MUST BE TAKEN ON TONGUE INSTEAD OF 12

Sides	B Angle	T Angle	Blade
3	30°	60°	20 25/32
4	45°	45°	12
5	54°	36°	8 23/32
6	60°	30°	6 1/16
7	64°17′	25°43′	5 3/32
8	67°30′	22°30′	4 31/32
9	70°	20°	4 11/32
10	72°	18°	3 29/32
11	73°38′	16°22′	3 17/32
12	75°	15°	3 1/32

TABLE NO. 3—SHOWING LENGTH PER FOOT RUN

Rise	Length	Fraction	Gain
1″	12.0416″	1/32″	.0416″
2″	12.1655″	1/16″	.1655″
3″	12.3693″	3/32″	.3693″
4″	12.6491″	1/8″	.6491″
5″	13″		1″
6″	13.4164″	1/32″	1.4164″
7″	13.8924″	1/16″	1.8924″
8″	14.4222″	3/32″	2.4222″
9″	15″		3″
10″	15.6205″	1/8″	3.6205″
11″	16.2788″	1/32″	4.2788″
12″	16.9706″	1/16″	4.9706″
13″	17.6918″	3/32″	5.6918″
14″	18.4391″	1/8″	6.4391″
15″	19.2094″	5/32″	7.2094″
16″	20″		8″
17″	20.8087″	1/32″	8.8087″
18″	21.6333″	1/16″	9.6333″
19″	22.4722″	3/32″	10.4722″
20″	23.3238″	1/8″	11.3238″
21″	24.1868″	5/32″	12.1868″
22″	25.0599″	3/16″	13.0599″
23″	25.9422″	7/32″	13.9422″
24″	26.8328″	1/4″	14.8328″
25″	27.7308″	9/32″	15.7308″

Problems in Geometrical Drawing—Various Tables of Special Value to the Builder

five sides, as shown at *A* in Fig. 11. If we wanted to cut on the tongue for five sides we should take about 37 on the blade, and as the blade is only 25 in. long I take 3 29/32 on the blade and cut by it.

It will be seen in Fig. 11, at *B*, that by taking the same figures as for the butt joint the blade also gives the central angle of 72 leg.; also it will be seen at *A* in Fig. 10 that by taking the same figures on the square as we used in Fig. 8, the tongue gives the central angle as if we were making a hexagon floor and the joist *b* ran all the way through. The tongue would give the cut on the joist *a* to fit against *b*.

Referring now to Table No. 2 it says take 12 on the tongue and the blade gives the cut for outside, or to miter plate, while the tongue gives the cut for inside or to miter rafter, except per foot run must be taken on the tongue instead of 12. The first column gives the number of sides; the second column, *B* angle, gives the angle a blade makes with a line or the edge of a board; the third column, T-angle, is the angle between the tongue and the edge of the board, while the fourth column gives the figures to take on the blade for the different polygons.

Suppose it is desired to miter a hexagon. We look in Table No. 2 for six sides and we find 6 15/16

Referring now to Fig. 12 we have 12 on the tongue and 10 1/16 on the blade—the angle for nine sides, according to Table No. 1. The tongue gives an angle of 40 deg., which is the central angle, also the outside angle. The blade gives an angle of 50 deg. between the blade and the horizontal line. The tongue gives an angle of 50 deg. between it and the perpendicular line, while the blade gives an angle of 40 deg. between it and the perpendicular. The four angles together make 180 deg., or two right angles.

This is the case no matter how we apply the square, as will be seen in Fig. 13. We have 12 on the tongue and 6 15/16 on the blade, which gives the butt joint for twelve sides and the miter joint for six sides. The tongue gives an angle of 30 deg. and 60 deg., and the blade gives an angle of 60 deg. and 30 deg.; also the blade makes an angle of 120 deg. from the line on the right as shown, and the tongue makes an angle of 150 deg. from the horizontal line on the left.

The fractions given in all three of the tables are intended to be the nearest thirty-second of an inch and while they may not be perfect they are near enough for most practical purposes and by the use of the tables many angles may be found.

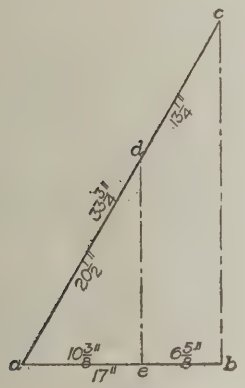


Fig. 6—Another Phase of the Problem in Fig. 4

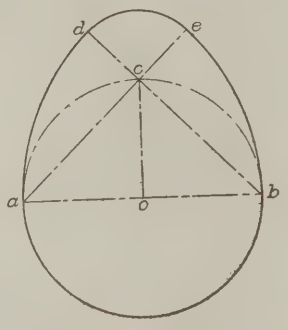


Fig. 7—Drawing an Egg-Shaped Oval

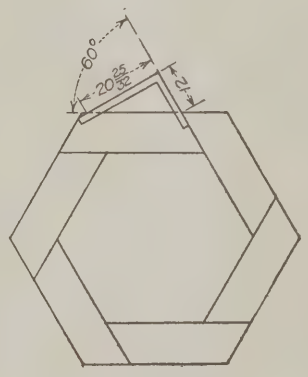


Fig. 8—A Hexagon

Problems in Geometrical Drawing—Some Solutions of Special Value to the Builder

for the blade and 12 for the tongue: the blade gives the cut as shown in Fig. 9. If we want to put in short floor joists, as at *B*, Fig. 10, we take the same figures as in Fig. 9, but according to Table No. 2 we cut by the tongue instead of by the blade.

To miter five sides Table No. 2 gives 8 23/32 on the blade and 12 on the tongue. The blade gives the cut, as shown at *C* in Fig. 11.

The miter cut for an octagon is 4 21/32 on the blade and 12 on the tongue; the B-angle, that is, the angle between the blade and the line on which the square is applied is 67 deg. 30 sec., as shown in Fig. 14, and the T-angle, that is, the angle between the tongue and the line on which the square is applied has 22 deg. 30 sec., as shown; now

$$67° \ 30' + 22° \ 30' = 90°$$

or one right angle, and it will be seen all through Table No. 2 that B-angle + T-angle = 90 deg.

In Table No. 1 the central angle is the same as the outside angle, as will be seen at *A* and *B* in Figs. 11 and 8, and the angle at *A* in Fig. 10.

Table No. 3 is very handy for connecting inclined work such as rafters, hoppers, etc. The first column gives the rise per foot run; the next column the length in inches and decimals; the third column the equivalents of the decimals to the nearest thirty-second, and the fourth column gives the gain.

For a rise of 9 in. to the foot the length is 15 in. and the gain is 3 in.; that is, the slope length is 3 in. longer than the run. For a rise of 12 in. to the foot the length is 16.9706 in., or 16 31/32 in., often called 17 in.

If *B*, Fig. 10, was a rafter with a rise of say 10 in. to the foot and it was to be cut against the hip, Table No. 2 says take the length per foot run on the tongue instead of 12; so we look in Table No. 3 and we find that for 10-in. rise the length is 15⅝ in., so we take this figure on the tongue and 6 15/16 on the blade and apply, as in Fig. 10 at *B*.

We cannot always use these tables, for occasionally the rise per foot run is not in even inches and the corner of a building is often an odd angle.

We must then make a drawing of the corner on a board or elsewhere and know how to use the square accordingly.

If the run and rise come out in even numbers Table No. 3 can be used to find the length of the rafters. Suppose, for example, we have a run of 10 ft. and a rise of 8 in. per foot run, then to get the length of rafter we look in the length column in Table No. 3 and find 14.4222 in. as the length per foot run. For a 10-ft. run we have therefore:

$$14.4222 \times 10 = 144.222 \text{ in.}$$

the length of rafter, or 12 ft. 7/32 in.

Drawings Are Not Architecture

We are told on excellent authority that a written play is not a play at all. It is only a book of directions for bringing one into existence. Similarly a set of plans does not constitute an architect's output any more than a copy of his specifications. Like a play, the plans are merely the directions for producing something. A drawing, be it ever so attractive and convincing, is only a promissory note which binds its maker to deliver in the concrete what is stated on its paper face, said Arnold W. Brunner, in an address before the National Institute of Arts and Letters. Sometimes it may be well to pause and consider if the author has sufficient funds in his mental bank to make good.

Like the dramatist, certain forces stand between the architect and his audience. I am told that dramatic authors often find difficulty in maintaining their conception and persuading managers, producers and actors to follow their ideas and faithfully interpret them. The architect has his interpreters, too. Masons and carpenters, plasterers and cabinetmakers, carvers and decorators, workmen of all kinds—whose only aim in life is apparently to deviate from the plans as much as possible. These mechanics can so mutilate and distort a design that the result may be very different from the architect's conception, which remains a dream that the public will never know.

Annual Waste of Wood

According to the Forest Service of the U. S. Department of Agriculture the output of waste in the form of sawdust, shavings, slabs and other wood refuse of the more than 48,000 saw mills in the United States is estimated at 36,000,000 cords per year. Perhaps one-half of this so-called waste product is not, strictly speaking, wasted, but serves a useful purpose as fuel under the boilers. Much of the remaining 18,000,000 cords not only serves no useful purpose, but in most cases is a source of inconvenience and danger, at the same time costing the mill time and money.

Saw mill waste is disposed of in various ways, and at present the Forest Service is working on the problem of the utilization of the waste in such a way that it will pay for its disposition.

Galvanized corrugated iron in sheets is much used for roofing and as a covering for sides of buildings, walls of inclosures, partitions, etc., in the larger towns of the Dominican Republic.

The fossil coral of the Fiji Islands is said to be the best building stone in the world. When first cut it is almost as soft as cheese, but it solidifies in the air until it is as hard as granite.

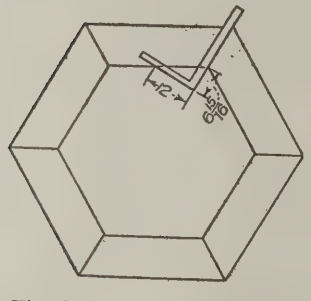


Fig. 9—Mitering a Hexagon

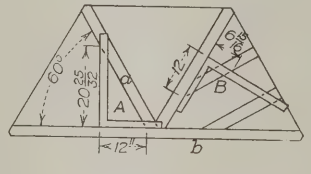


Fig. 10—Diagram Showing Central Angle as in Laying Out a Hexagon Floor

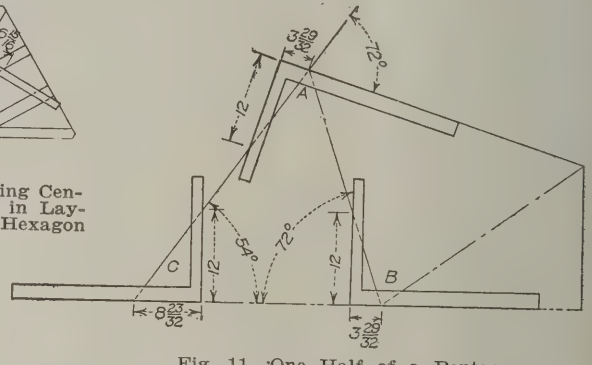


Fig. 11—One Half of a Pentagon or Five-Sided Figure

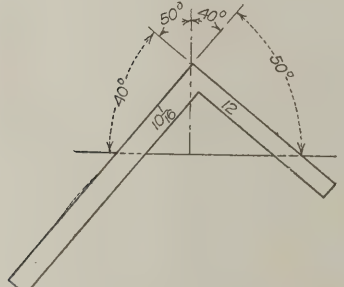


Fig. 12—Diagram Showing How to Obtain the Angle for Nine Sides

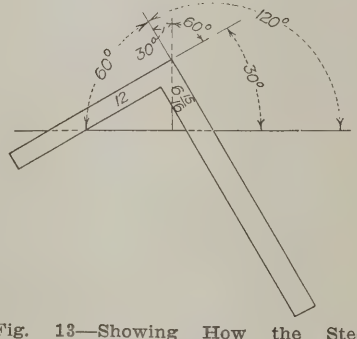


Fig. 13—Showing How the Steel Square Gives the Butt Joint for Twelve Sides and the Miter Joint for Six Sides

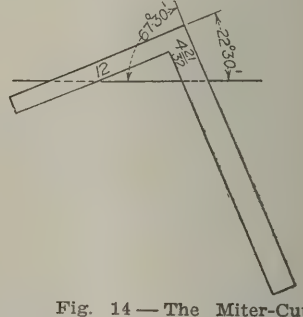


Fig. 14—The Miter-Cut for an Octagon

Problems in Geometrical Drawing—Solutions of Special Value to the Builder

Hints for Removing Stains from Wood

How Small Articles May Be Bleached—Directions for Taking Out Weather-Surface Stains

TO bleach stains out of wood a number of points must be observed to make a successful job and to prevent the after-effects from the bleaching materials and chemicals. Soft wood or close-grained woods, such as pine, etc., require bleaching at times as well as hard woods, and the treatment of either of those woods is almost similar. The stains usually required to be bleached out of wood are as follows: Weather or water stains, alkali stains, color stains, particularly aniline stains, dog and cat urine stains, iron rust stains, etc. The bleaching out of rust stains and dog's urine has been difficult and has so far withstood all usually employed methods, but, nevertheless, it is an easy matter.

Hard Woods Difficult to Bleach

The hard woods which are easily affected by the weather by alkalines, etc., and which are difficult to bleach, says a writer in the *Painters' Magazine*, include all woods containing tannic acid in a larger or lesser degree, and include oak, mahogany, cypress, birch, cherry, chestnut, walnut, ash, etc. All sappy or white woods are more easily bleached, such as pine, spruce, hemlock, whitewood, poplar maple, bass, gum, and similar woods.

As mostly all of the wood to be bleached has some kind of a finish it is of importance to have the finish thoroughly removed before starting the bleaching process. In the case of using a remover containing oil or wax, a final cleaning must be done with soda water or alcohol, to remove all traces of the wax and to allow the bleaching material to affect the wood and to penetrate. As all methods for bleaching wood are based on water-soluble chemicals, it is impossible to avoid the sponging up of the wood or the raising of the fiber of the wood.

How to Bleach Small Articles

To bleach small articles, it is advisable to have a wooden tank made of sufficient size to immerse the articles to be bleached, which also would make a more perfect job and save a good deal of the bleaching material, although this is very low priced. The tank for this purpose must be properly joined. No nails or other iron parts should be used on it, and the joints should be bound with white-lead putty or casein. A porcelain-lined metal tank would also answer the purpose, or a rubber-coated tank would be advisable.

For ordinary bleaching of surface-weather stains the following solution is sufficient: One pound oxalic acid dissolved in one to one and one-half gallons of hot water. For a more deep-rooted stain an addition of strong white vinegar, or still better, acetic acid, is required, and the bleaching liquid should be applied as hot as possible, repeating the application of same until sure that the bleach has gone as deep into the wood as the stain itself. After bleaching, it is required to thoroughly wash the surface, and an extra sponging off with vinegar is essential.

To bleach aniline stains apply a strong solution of chloride of lime and after a while wash off with clean water, after which apply the oxalic acid method as above given. If the stains do not yield to this treatment, apply a solution of tartaric acid, and treat afterward as above.

Removing Rust Stains

For rust stains the same method is to be used, but in bad cases, instead of using tartaric acid, diluted hydrochloric acid, or a solution of citric acid will do the trick. The chloride of lime method is to be used for dog or cat urine stains. In all cases the oxalic treatment afterward is required.

The methods, therefore, of removing such stains are simple enough, but great care must be observed in the handling of those chemicals, as all of them are more or less dangerously poisonous.

In refinishing the wood, the following is to be strictly observed to make a perfect job, and particularly if the wood has to be filled or stained to avoid a spotted or clouded appearance of the finish. After thoroughly cleaning and drying of the bleached surface, do not sandpaper, but apply a thin coat of shellac which must be pure, greatly reduced with alcohol, about one-half the strength of the regular article used for finishing. Allow twenty-four hours, or as long as possible, for the shellac to dry, after which sandpaper, and only then start the staining, filling or whatever finish is required. The shellac, be it ever so much reduced, will harden the raised fibers of the wood, and by sandpapering (or using steel wool) they will cut the fibers off short, making a perfectly smooth surface; furthermore, the softer parts of the wood will absorb the shellac to some extent, preventing the stain or colored filler to accumulate in those parts more than on other sections of the surface, and will give a more uniform finish. This is particularly important and apparent where cross-cuts of the wood are intended to show a uniform finish or color with the balance of the job. This treatment with shellac is intended for exterior as well as interior work, and is in no way detrimental for the best exterior work, providing the guaranteed pure shellac is used.

Aniline Stains

If aniline stains are not intended to be removed, but it is wished to prevent them from striking through subsequent coating, particularly enamel or paint, etc., the following method is suggested for making stains permanent: Take 1 lb. of green copperas (ferro-sulphide) and dissolve in 1 or 2 gal. of hot water. Add to it one-half the quantity of alum and apply one to two coats of this over the surface.

A Two-Family House of Hollow Tile

Each Apartment Designed to Secure Utmost Privacy —Stucco Finish—Construction Partially Fireproof

THE interest which builders and architects evince in the subject of the Two-Family House has caused us to present a dwelling of this type as the subject of our colored supplemental plate. The house has been designed for a lot with a frontage of 40 ft. and with the idea in view of compactness in plan, comfort in size and number of rooms, privacy, partial fireproof construction, etc.

According to the specifications of the architect, the foundation walls are to be of concrete, 10 in. thick, supported on footings of the same thickness and extending 6 in. beyond each side of the walls above. All concrete to be mixed in the proportions of one cement, three sand and five of broken stones.

The Framing Timbers

All framing timbers are to be of spruce with girders 4 x 8 in., plates 4 x 4 in., and the first and second floor beams 2 x 10 in., placed 16 in. on centers and braced with 2 x 2-in. cross bridging spaced 5 ft. on centers. The beams will be set on terra cotta slabs 1 in. thick, which are to serve as bearing plates. These slabs are also to be used for working up levels and story heights where the blocks do not work out correctly. All openings are to be spanned by lintels, using special lintel blocks reinforced with bars and concrete. Concrete or hollow tile blocks will be used for the construction of porch and entry columns. The second floor ceiling beams and roof rafters are to be 2 x 8, all placed 20 in. on centers. The interior partitions are to be built up of 2 x 4 studding covered with wood lath and the studs are to be doubled at all openings.

The Exterior Walls

All exterior walls are to be of terra cotta hollow tile blocks, 8 x 12 x 12 in. set in a mortar consisting of one part cement to three of sand, with not more than 10 per cent of the mass by volume of well slacked lime. The tile is to be thoroughly wet before applying the stucco, which is to be two-coat work throughout. The scratch coat is to consist of one part Portland cement, three parts sand and not more than 10 per cent lime putty. It shall be at least a half-inch thick and applied under pressure. The finish coat shall consist of one part cement, two parts sand and shall be 1¼ in. thick.

The roof plates are to be bolted to the hollow tile walls every five feet. The roof is to be covered with sheathing boards over which is to be placed a layer of tarred roofing felt, upon which, in the sloping parts, is to be laid dark green slate exposed 5½ in. to the weather, and in the rear portion tin is to be used, the tin to have a good coat of metal paint before being laid. Leaders for front gutter to be carried down in the hollow tile.

The chimney, which takes care of both the heating systems and the fireplaces in the living rooms, is to be built of brick and have four flues lined with vitrified flue lining.

The exterior woodwork is to be of clear white pine, and all interior trim may be of cypress, pine or birch.

Arrangement of Rooms

An inspection of the floor plans shows that special attention has been given to the privacy of each apartment; each family having its own separate entrance, rear kitchen, separate cellar and yard with entrances thereto, and separate furnace.

Each apartment is entered through a reception room which leads into a good sized living room, the main feature of which is a fireplace. The reception room also opens through French casement doors onto a private porch. The living room is separated from the dining room by a cased opening. The kitchen is reached by way of the pantry, and also from the small hall out of which opens the bath room and sleeping rooms. The refrigerator space is conveniently placed and a private stairway leads to the cellar. A sleeping porch can be reached through French casements from either the kitchen or rear bed room.

The cellar extends under the entire building and is to have a 4-in. concrete floor with a smooth cement finish.

All rooms are to be plastered, the plaster being applied direct to the hollow tile walls as the blocks are arranged to receive it. The living room is to have a sand finish.

All floors are to be brought to a smooth finish, filled and varnished. The living and dining rooms to receive an additional coat of wax.

The Interior Trim

The interior trim is to be stained and finished flat. The living and dining room walls and ceiling are to be tinted, the bed room walls papered and the kitchen and pantry trim to be painted three coats of white flat paint.

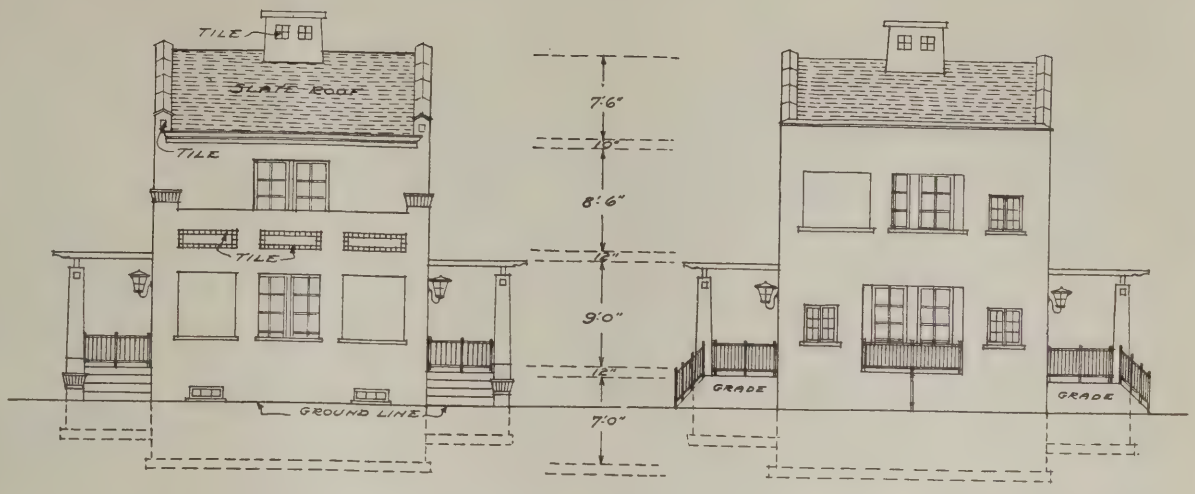
All sheet metal work is to be painted on both sides before it is laid and all leaders are to be of galvanized iron.

A good system of plumbing is to be installed with simple fixtures, using a galvanized iron enameled sink and a three-part wash tray of soapstone or enameled iron. All the plumbing is to be exposed, the rough pipes being painted with enamel paint.

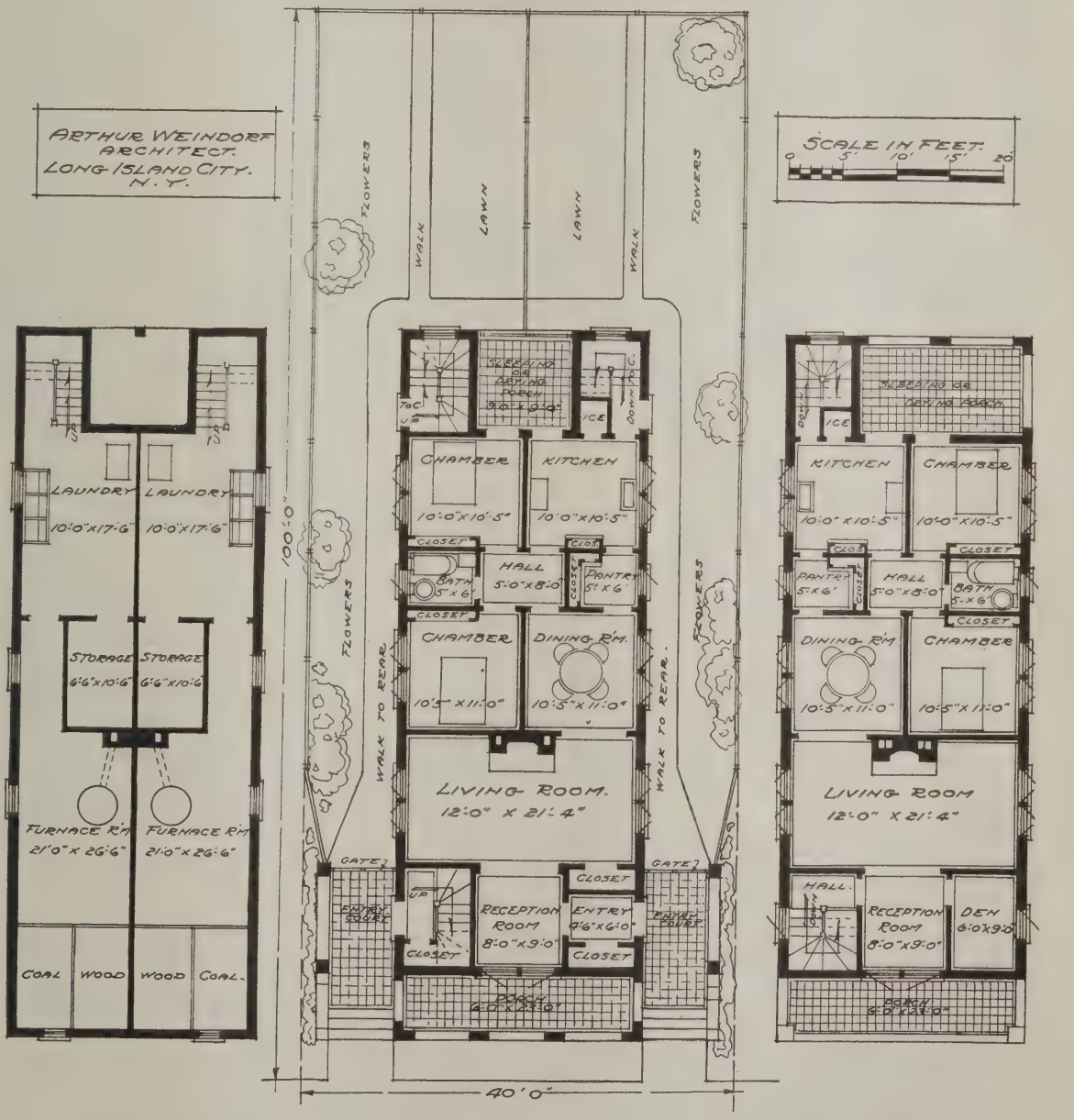
The bathroom is to contain an iron enameled bath tub, the water closet to have a china bowl with hardwood seat and high tank, and the washstand a china bowl and marble top. All exposed pipes are to have a nickel-plated finish. Fixtures are to be



BUILDING AGE

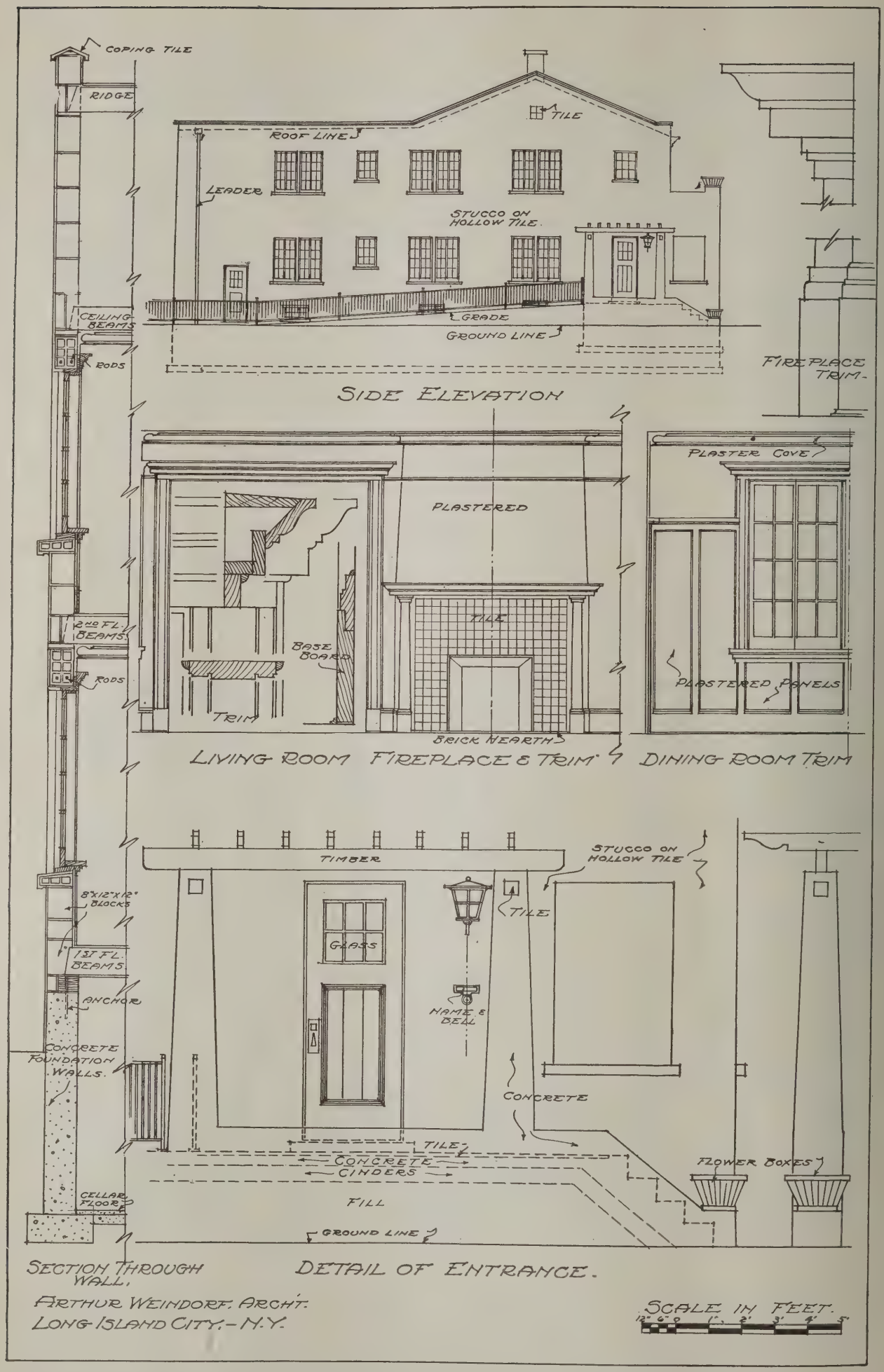


FRONT ELEVATION REAR ELEVATION.



CELLAR FIRST FLOOR SECOND FLOOR.

Plans and Elevations of Two-Family House Shown on Colored Supplemental Plate This Month



Miscellaneous Constructive Details of Two-Family House Forming Basis of Supplemental Plate

supplied with hot and cold water, the former being supplied by means of a gas water heater.

The hardware is to be of a neat, plain bronze finish.

The lighting is to be by means of electricity or gas. The living room is to contain two drop pendants, the dining room to have one ceiling light and one side wall light. All other rooms are to have one light each.

Each apartment is to be heated by a steam heating system with radiators located in all rooms excepting the kitchen and it shall be of sufficient size to properly heat the rooms in zero weather. Cooking will be by gas or electricity.

The architect computes the cubical content of the house as 39,777 cu. ft. and places the unit cost at 20c. per cubic foot.

The total figures of cost include a contractor's profit of 10 per cent, but do not include the cost of lighting fixtures, gas range or gas water heater.

The two-family house here shown was designed by Arthur Weindorf, Long Island City, N. Y., or care of THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Arrangement of Sliding Partitions

The Flush Door Partition, Which Is One of the Three Principal Types—Various Details

BY E. J. G. PHILLIPS*

THE best and most substantial method of closing large openings in the flush door partition. Fig. 20 represents an interior view of one of the new Philadelphia schools in which twenty-four of these partitions are used. The partitions can be arranged so that when opened, the doors are moved back into pockets and completely concealed or the partition may be composed of one stationary door and a number of sliding doors, all when opened occupying a position alongside the stationary door.

In Figs. 21 to 23 are shown floor plans and elevations, the first of which shows a partition in which all of the doors slide into a pocket at one side of the room. The width of the doors is not limited by the equipment, but all of the doors should be the same width except the first and last doors. The outer stiles of these doors should be made slightly wider to allow for the lap over the jamb. By using a wider stile, the appearance of the partition is improved because the exposed parts of all the stiles will be the same width. Each door has its own track, that of door No. 1 being straight, but the tracks for all of the other doors require compound curves to bring the doors into line with the first door. The meeting stiles of smaller doors are usually tongued and grooved, but for the larger doors, metal astragals are generally used. The detail Fig. 24 shows the metal astragal applied to doors 2½ in. thick and also joint for smaller doors.

In school rooms it is common practice to build blackboard panels in the doors.

A small door hinged to the jamb at "K" is used to close the opening into the pocket when the doors have been withdrawn. It may be arranged to lock to door No. 1 and so prevent any unauthorized person from meddling with the partition. When the doors are moved back into the pocket, the front edge of door No. 1 should stop flush with the jamb, the other doors sliding back far enough to permit the small hinged door to be swung into position and locked to the front edge of the door No. 1. This locks the partition in the open position.

A flush floor bolt should be used at the bottom of each door, at the side farthest from the pocket. Each door should also be provided with a flush pull.

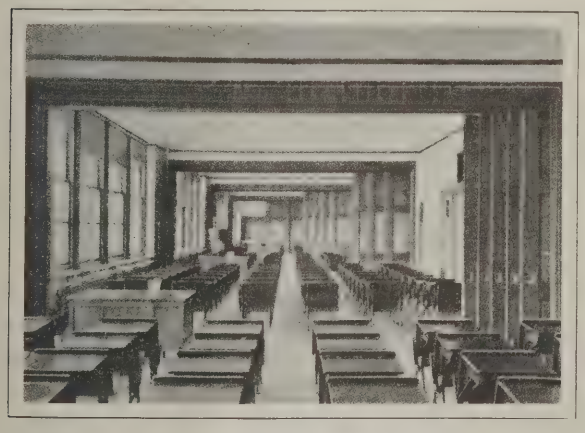


Fig. 20—Good Method of Closing Large Openings is by the Use of Flush Door Partitions as Shown

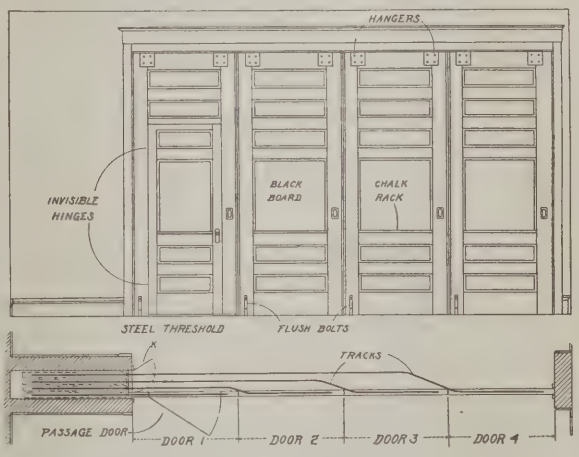


Fig. 21—Plan and Elevation of Partition in Which the Doors Slide Into a Pocket

Arrangement of Sliding Partitions—The Flush Door Type

*Engineer Richards-Wilcox Mfg. Company.

The second plan, Fig. 22, illustrates the use of the stationary panel instead of the pocket and is of course similar in size and design to the sliding doors.

The third plan, Fig. 23, illustrates doors sliding toward both sides of the room and obviously either the pocket or the stationary panel may be used.

When it is necessary to provide a means of communication between the rooms separated by the partition, a wicket door should be built in one of the sliding doors, as shown in door 1, of Fig. 21, or preferably in the stationary panel if this is used, as in Fig. 22. A steel bar threshold as previously described, should be used. Hinges, locks and other hardware are similar to that suggested for the service doors under parallel door partitions.

Vertical cross-sections of two styles of overhead sections shown. The track brackets are generally spaced not to exceed 24-in. centers except for very light doors.

When erecting the track and brackets, care should be used to follow the plans furnished by the manufacturer, showing proper spacing and location of tracks and brackets. Strike a chalk line over the center line of each track and bore the bolt holes on this line through the header. The end brackets are provided with bumper lugs which engage corresponding lugs on the hanger apron or a stop attached to the door. These limit the movement of the doors and stop them in the correct location.

The tracks, as will be noted, are entirely enclosed with steel casings and soffits, excepting narrow slots or openings in the soffits for the pendant bolts of the hangers to travel in. The casings and soffits are attached to the brackets with

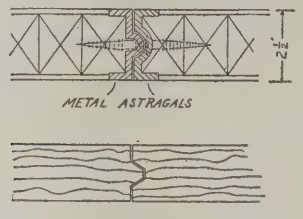


Fig. 24—Detail of Metal Astragal

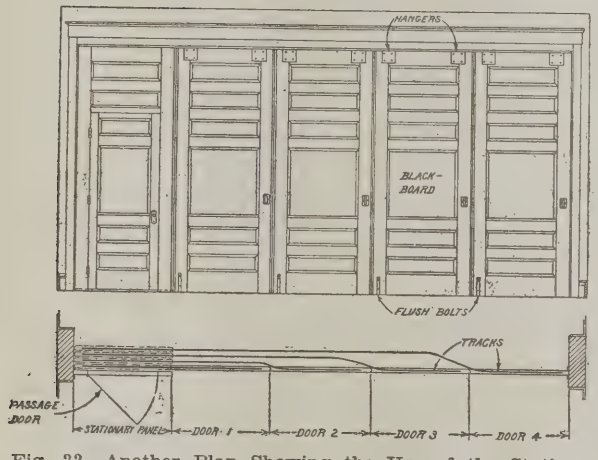


Fig. 22—Another Plan Showing the Use of the Stationary Panel Instead of the Pocket

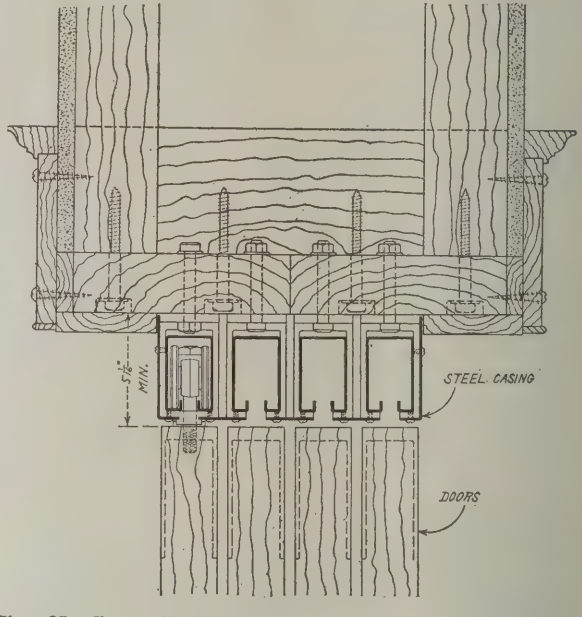


Fig. 25—Cross Section Showing the Tracks Attached to Wooden Headers

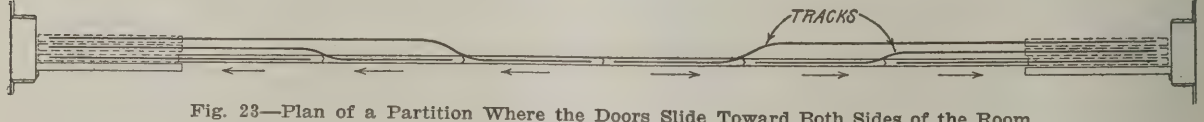


Fig. 23—Plan of a Partition Where the Doors Slide Toward Both Sides of the Room

Arrangement of Sliding Partitions—The Flush Door Type

construction are given in Figs. 25 and 26. These being typical, will vary according to local conditions and they are given only as suggestions. In Fig. 25, the tracks are attached to wood headers and in Fig. 26 steel and concrete construction is shown. Two sizes of tracks are illustrated, either one of which may be used with wood or steel supporting members. The distance from top of doors to header is 5 1/16 in. and 4 in. The tracks are located on 3-in. centers for any thickness of door up to 2½ in. For thicker doors the center distance varies an amount equal to the increase in the thickness of the doors.

The track brackets should be attached with through bolts and the header should be cased up in such a manner that access to the nuts may be had, should it be necessary to remove the track. Notice that this is provided for in both cross-small machine screws, tapped holes having been provided in the brackets for this purpose and may be finished to match the doors and trim.

Four-wheel hangers for the larger size track or eight-wheel hangers for the smaller size track are suitable for doors weighing up to 600 lbs., but for heavier doors, eight-wheel hangers for the larger size track should be used. These hangers are constructed with knuckle jointed frames in order to take the truck curves easily. The side plates which are attached to the door are designed to reinforce and tie the top rail and stiles of the door together. To get the full advantage of this feature, the stiles should be 7 in. wide. The hangers must be located properly on the door, the distance from the edge of the door to the center of the hanger varying from 8½ in. to 12½ in. according to the style hanger used.

These partitions are used as high as 16 or 18 ft., but considering the fact that in moving high doors, the force is applied a considerable distance below the center of the door it is wise to make high doors reasonably wide to overcome any tendency to kick up and bind when moving into position.

If desired the floor guides shown in Fig. 27 may be used. Two rollers are set into the bottom of each door, one directly under the pendant of the door hangers. The guide track is formed of steel wearing strips filled in with ⅜-in. hardware flooring between. This may be built in to form a raised threshold or it may be finished flush with the main floor, according to structural conditions. It is essential to locate the curves exactly beneath the curved track above.

The flush door partition, though perfectly adapted for the smaller opening, is especially useful for large openings such as occur between two main rooms in public schools or churches. This is well illustrated in Fig. 28 which is a plan of part of a large Connecticut school. Four classrooms and corridor are converted into a large assembly hall by moving six flush door partitions. This is a good example of the efficient use of floor space.

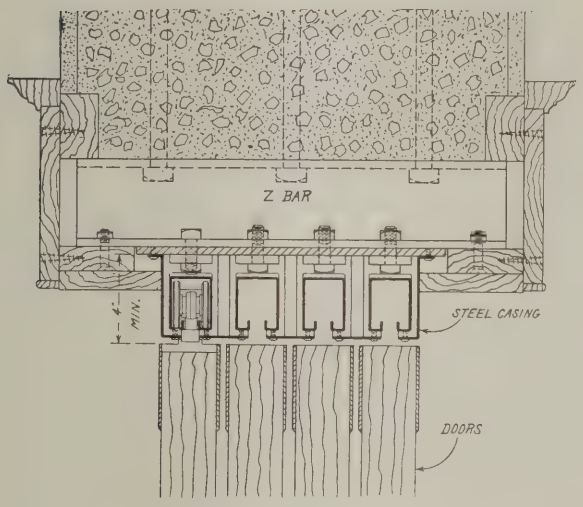


Fig. 26—Detail Showing the Concrete Construction

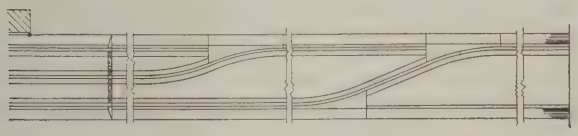


Fig. 27—Showing Use of Floor Guides

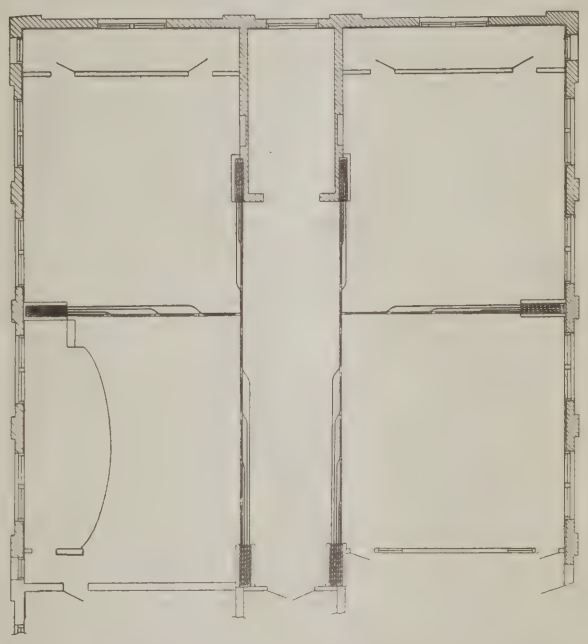


Fig. 28—Plan of Large School, Showing Four Classrooms and Corridor Converted Into an Assembly Hall

Arrangement of Sliding Partitions—The Flush Door Type

Blistering and Cracking of Paint

There is no class of work that is so annoying and damaging to the painter's reputation, says John W. Luthe, in a paper read before the Master House Painters' and Decorators' International Association of the United States and Canada, as the blistering and cracking of paint on outside work.

Blistering is more prevalent than scaling and cracking, and the cause is not generally understood by customers and painters, many painters assuming responsibility for the blistering, although having used strictly pure lead, colors and oil. The cause for blistering has been attributed by many painters and laymen alike to early painting in seasons, painting during the hot months of July and August, others to autumn painting, and some to the damp weather and at times to the fog. It is a mistaken idea: all blistering is caused from fat or old paint, foreign to pure or fresh paint.

There are blisters caused by inner dampness from within, priming while building is under construction, wood not thoroughly dry, or wet plaster on the inside, leaks from gutters, and in some cases from pitch and sap, but these are not the most prevalent. If the under coats are not dried, but sticky, or if the work has been painted with a paint that was fat, old oil, mineral oil, fish oil, too much yellow ochre, or any material foreign to linseed oil and lead, the work will blister, notwithstanding the fact that it was done according to the best paint catechism, pure materials, July, August, or any other month included.

A priming, second or third coat of paint, composed of fresh white-lead and turpentine and oil, applied in just ordinary weather, will not and can not blister, but any old left-over paint, fish oil or petroleum oil, fatty turpentine, or too much yellow ochre, especially the cheap grade, ground in some non-drying oil, will blister after becoming painted over, although the coating was pure white-lead and colors and oil.

Has anyone ever noticed, in opening some of the blisters, that the underneath or the coats that were separated were shiny, glossy, and that the undercoat was mostly of an ochre shade or composed of considerable ochre and black?

For many years the writer's attention has been attracted to store fronts, sash, front doors and trimmings of houses or houses painted in dark colors, especially those shades composed of ochre, black, red and green, all blistered and some parts sticky. Having come in contact with many old-time paint-

ers in years past, and become very familiar with their shop methods and materials used for priming, this same old method is still found to be in use in some of the shops which believe that the older the oil and paint the better the job will be.

Results of Ignorance in Painting

Ignorance in the painting trade has caused more damage than wilful dishonesty, also some blisters to boot. In some of these shops left-overs were put in a container, barrel or tub, a considerable amount of yellow ochre was added, and material for priming would be taken from this mixture.

Any building or parts of it primed with this fat paint or all yellow ochre or any oil foreign to linseed oil will cause the following coats to blister. It is not the priming proper, so to speak, that blisters, it is the last coats. The undercoat being fat or sticky never dries.

When the last coats of paint are dry, the oil well oxidized, and the coating becomes perfectly airtight, the sun beating on this surface heats or boils the undercoat or priming, creating gas; the last coats being air sealed will expand from this gas, separating the last coats from the undercoating, whatever they may be, causing blisters. The above does not apply to some blisters, such as gas or pitch blisters, which are unavoidable.

Cracking of paint in most cases is from an undercoating not dry, and finishing coats too thick, heavy, or too brittle, too much zinc in paints, or mixed paints of an inferior grade. White-lead oil and turpentine can not and will not crack if properly applied and given a reasonable time to dry between coats.

When Cracking of Paint Is Likely to Result

A building that is being repainted with the oil paint in fair condition, and the first coat being applied too heavy or with a shortage of turpentine, and coated with a second coat before the first coat has digested or hardened, cracking will follow on certain parts of the building. Whatever applies to inside work applies to outside, whether paint, enamel or varnish.

Scaling of paint is due to several causes. Priming when the surface is damp or wet, priming materials too flat, cheap mixed paints, dampness from weather, or leaking gutters where water runs down on the inside of siding, such dampness will throw paint off no matter how, when, or what the paint consists of.

On many old houses it has been found that on the first clapboard from the water table or belt, paint is loose or scaling on the lower half or siding; also on lower parts of columns and spindles of porches, the paint was being thrown off, caused from the dampness, the lower edge of the siding being unpainted and water lodging on the water table, giving the unpainted surface a chance to absorb the moisture, causing scaling.

One other annoying part with outside work is that of alligatoring, which is not cracking. Cracking is where the paint cracks at right angles to the grain of wood. Alligatoring is when the last coats of paint have shrunk so as to leave the surface to look something like a map in miniature—like a county or township map.

Cracking only to the hard undercoating or good priming, whatever coat or coats there may be, this alligatoring will take place if at any time a building or surface is repainted and the first coat of paint is too heavily applied or too short in turpentine or old fat color, or too much yellow ochre and followed with strictly pure lead in oil, alligatoring will take place. The last coat of paint drying from the surface will naturally help to dry the first coat; when the undercoat dries, the upper gives way, and alligatoring takes place.

Chattanooga's Largest Office Building

What is said to be Chattanooga's largest office building is the twelve-story and basement structure now in course of erection for the Volunteer State Life Insurance Company, the location being in the geographical center of the city and on one of the highest parts of the business section. It is so situated as to have a frontage on three streets.

The foundation is built upon bed rock and has reinforced concrete caissons. The building is of skeleton steel frame construction with curtain walls of brick and tile. All floors are of concrete and tile. The architecture is Italian Rennaissance, with the lower three stories of terra cotta and Tennessee marble. The main entrance will have walls and elevator fronts of white marble and floors of light gray Tennessee marble with a border and base of green Georgia marble. The doors in the main lobby will be mahogany. All inner offices will face on a court 50 ft. wide, faced with white vitreous brick. The steel work was erected by the Atlanta Ferro Concrete Company.

Use of Hollow Tile in Oakland Buildings

The City Council of Oakland, Cal., recently passed an ordinance regulating the use of interlocking tile in buildings. This includes interlocking hollow tile under the term, "masonry," and provides for a certain density of material, an ultimate crushing strength of 1500 lb. per square inch, with allowable stress on bearing members of the tile limited to 150 lb. per square inch of net area. It admits tile buildings with incombustible roof covering in Class C, and permits such tile to be used for the construction of exterior and bearing walls in Class C buildings not over three stories high, the walls to be of same thickness as brick walls. Various other provisions are also included, governing usage of hollow tile supporting floors, etc.

According to the report of the Bureau of Statistics and Information of the New York State Department of Labor the percentage of idleness April 15 was 27½ as compared with similar figures for 1915 of 41.2 per cent, for 1914 of 40.2 per cent and for 1913 of 19.6 per cent; the figures covering fifty-nine unions with about 32,000 members.

Built in five months, burned in five hours, and rebuilt in five weeks, is said to be the record of Hopewell, Va.

Design of Beams, Girders and Trusses*

A Series of Articles on the Above Subjects in Which Only Arithmetic Is Used for the Calculations

By Ernest McCullough, C.E.

THE stresses in the top and bottom chord of a bowstring truss are found with sufficient accuracy by assuming the truss to be uniformly loaded. The moment divided by the depth gives the maximum stress at the center of the top chord and throughout the lower chord, the formula being

$$T = C = \frac{wl^2}{8d}$$

in which T = total tension,
C = total compression,
l = length in feet,
w = uniform load per lineal foot,
d = depth in feet at center of span.

The chord assumes some of the functions of braces as the ends are approached where the inclination of the chord increases, and the compression is nearly uniform throughout the length. The compression at any point distant y feet from the center is given by the following formula:

$$C = \sqrt{\left(\frac{wl^2}{8d}\right) + (wy)^2}$$

The stress in the braces increases from the ends to the center as in the case of the Queen truss, and may be figured the same way. The vertical rods at the joints are in tension and the braces are in compression. The center panel is usually as wide as the height, which decreases the angles at which the braces are set as they approach the ends.

Steeply pitched roofs of the Howe truss type may be figured by the method of coefficients when the loads are uniform and symmetrically placed. They may be figured by the cumulative load method or by the shear method when unsymmetrically or irregularly loaded. In Fig. 68 the truss with one vertical is a King truss. When the vertical is a post it is a King Post truss, and when the vertical is a tie it is King Rod truss. At (*b*) and (*c*) are shown Queen trusses, these being known by the number of panels into which they are divided, and, like the King truss, being Queen Post or Queen Rod trusses as the verticals may be posts or rods.

In a system of roof framing all longitudinal members are called purlins, and all members extending from the eaves to the ridge are rafters. The top chord of a truss is composed of rafters. Main purlins extend from truss to truss, resting on the joints at the upper ends of verticals. Intermediate rafters rest on the main purlins when the spacing between trusses is considerable, and across the rafters sheathing is placed to carry the roof covering. By so doing all loads are concentrated at the upper ends of the verticals, so the truss rafters (upper chord) are in compression. Sometimes no intermediate rafters are used, the roofing being carried by purlins resting on the joints.

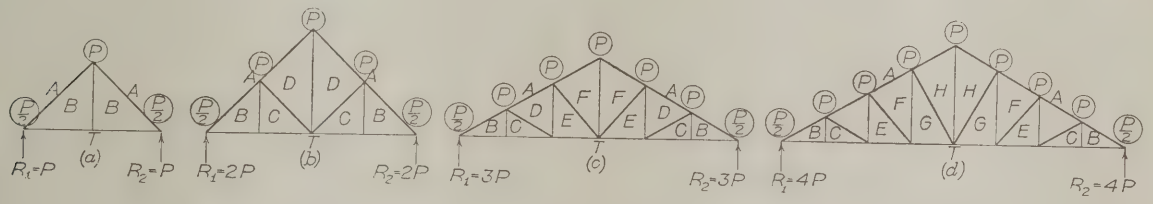


Fig. 68—(*a*) *A King Post Truss—B. C and D, Four-, Six- and Eight-Panel Queen Trusses*

To obtain proper results the sloping rafter of the truss is divided into equal spaces and verticals are dropped to the bottom chord (or tie). Braces extend from the foot of one vertical to the top of another. If, through any error or because it is considered best, intermediate purlins rest on the truss rafters, or the roof is carried directly on these rafters, it will be necessary to design them to carry the bending stress in addition to the direct compression.

In the King truss, Fig. 68 (*a*), the load, P, when applied at the upper vertex causes no stress in the rod BB. When applied at the lower end the stress is tension and equal to the load. The stress in AB = half the load, so the coefficient = ½. The stress in the horizontal tie rod = half the load $\times \frac{\text{half the span}}{\text{height}}$, that is

$$T = \frac{P}{2} \times \frac{L}{2d} = \frac{PL}{4d}$$

In the Queen truss the action resembles an arch in that the compressive and tensile stresses increase toward the supports in the rafters and tie, and the stresses in the verticals and diagonals decrease to-

Note in this series of articles no algebra is used. The rules are written in the modern way in the shape of formulas by using letters instead of writing in full words that are often employed. The words for which the letters stand are explained for every formula so that readers may in time understand how to read and comprehend formulas used by other writers. The actual computation is arithmetical and worked examples are given.—Editor.

*Continued from page 63 of the June issue.

ward the supports, for the inclined rafters carry part of the shear. Half of the load on each end panel is carried by the abutments and creates no stress in the truss.

In Fig. 68 (*b*) a load is assumed to be applied at the upper end of *BC*. If the load is at the lower end the rod *BC* carries this load to the rafter at the vertex of the triangle. If the load is applied directly to the rafter at the vertex there is no stress in *BC*. This will not again be referred to, as it applies to the rod in the end triangle in all trusses. Half the load is carried on *AB* and half goes down *CD* to the tie. The load on the top of the truss is increased by the load coming to the tie by the braces *CD* on both sides of the center, therefore it is $2P$, if the load on a joint is called P. The vertical rod, *DD*, however, carries only the load at the lower end. This load $2P$ from the top of the truss is carried half way down the truss to the joint and there it has added to it the load $P/2$ of the brace *AB*, this brace therefore carrying a load $= \frac{3P}{2}$. The tie rod is in tension by an amount $= \frac{3P}{2} \times \frac{\text{half the span}}{\text{height}}$

$$\text{or } T = \frac{3P}{2} \times \frac{L}{2d} = \frac{3PL}{4d}$$

In Fig. 68 (*c*) the rafter is divided into three equal parts. Each joint carries a load, P. The load on $DC = P/2$; on $DE = 3P/2$; on $EF = 5P/2$. The vertical *FF* carries $3P$. The rafter *AF* carries $3P/2$; *AD* carries $5P/2$; *AB* carries $3P$. The tie rod carries at the end a stress $= \frac{3PL}{2d}$. The stress in the tie rod on the section $TE = \frac{5PL}{4d}$. In actual practice the tie rod is uniform in size throughout the span.

Tracing the Loads

With the examples given the student should have no trouble tracing the loads on the members of the truss shown at (*d*).

Each vertical is in tension by an amount equal to the load it carries. Each diagonal member, is in compression by an amount $= \frac{xL}{d}$

in which x = amount of load on the member,
L = length of member,
d = the vertical height from the bottom to the top of the member, all measurements being on center lines.

The slope of the rafter is constant so the ratio is obtained once by dividing the slant length of the rafter by the height of the truss. The slopes change at each panel for the interior braces, so a ratio must be found for each separately.

Co-efficients for Fink truss, Fan trusses and Pratt trusses with inclined rafters have been calculated for different degrees of slope and for varying numbers of panels, based on uniform symmetrical loads. Tables of these coefficients are given on pages 309-311 of the 1913 edition of the Carnegie Pocket Companion for trusses to be made of steel or wrought iron. Steel is commonly used except when corrosion is a grave danger, in which case wrought iron is preferred. All metal trusses are made of rolled shapes with riveted connections. The trusses illustrated may be a combination of steel rods for tension members and wood for compression members. Fink trusses are very generally used because most of the members are in tension and the struts are short. Partial loading can never cause maximum stresses in the parts of Fink trusses as they may in other forms of trusses.

Roof Loads

For information as to proper roof loads and the effect of wind the student is referred to pages 305-307, 1913 edition Carnegie Pocket Companion. This will also be dealt with in the chapter on Graphic Statics. Usually city ordinances specify that a roof shall be capable of carrying 40 lb. per sq. ft. of horizontal surface in addition to its own weight, this allowing for wind, snow, live load and roofing. Some cities require only 25 lb. and others 30 lb. For a steeply pitched roof 25 lb. is proper, but for a very flat roof the designing load should not be less than 50 lb. per sq. ft. Each joint in a frame carries a load equal to the truss spacing times the panel length multiplied by the load per square foot.

The Signs Used for Stresses

The author mentioned that the positive (+) sign indicates compression and the negative (—) sign indicates tension. This is the way he was taught, and thirty years ago this use of the signs was common with American and British writers. There was a certain mnemonic aid in using the signs thus for compression thickens a body and tension makes it thinner, so the "minus sign" expressed the idea of thinness. In drawings the pieces in compression were indicated by heavy lines and the pieces in tension by light lines.

Continental European writers used the signs in a directly opposite sense for strict mathematical analysis in which careful attention must be paid to the signs of quantities resulted in bringing compression out at the end with a negative sign and tension with a positive sign. The well trained mathematician needs no aid from mnemonics. The result of late years has been to unsettle American and British authors and a reader of modern books must be careful to ascertain just how the signs are used by the author. It is to be hoped that at some not distant day all writers will agree upon a definite use of the signs, but for the purposes of the present work the author believes the mnemonic value, as given above, is too great to be neglected.

The value of the building improvements for which permits were issued in Miami, Fla., in April was over $500,000, this sum including a ten-story hotel and an eight-story office building.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

Methods of Building Construction

From D. P. Barry, Redford, N. Y.—I did not intend to comment on G. L. McMurphy's ideas of building, but when I read the article of "J. P. W.," Lane, Kansas, I changed my notion. When it comes to Kansas I'm at home. I lived thirteen years in that land of wind and shabby buildings, but we built lots of good structures, too. We were always up-to-date in most things, but often very cheap. I worked about 200 miles west of Lane, though I helped modernize a flouring mill in Junction City and went to school in Manhattan a long time ago. So I shall have to attend to "J. W. P." first. I give in Fig. 1 sketch of the first box sill I helped to make in Kansas. For cheapness nothing can surpass it. A 2 x 4 in. was nailed on the bottom edge of a 2 x 8 in. for each side of the building and the four pieces were then nailed at the corners. The studs were halved as in Fig. 2 and

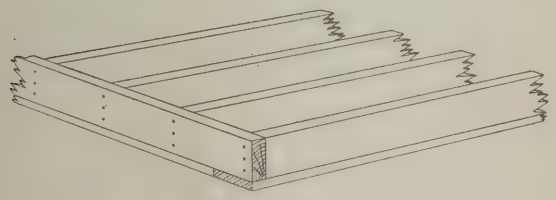


Fig. 1—A Kansas Box Sill

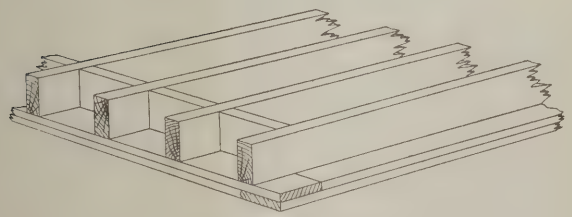


Fig. 3—A Good Sill, but Inexpensive

spiked to the inside of the 2 x 8 in.; the four outside corner studs could have no spur. The joists rested on the 2 x 4 in.

When I began to build for myself I fired all this, and if I were "J. P. W." I would fire his. If I cannot get timber for sills I use the style shown in Fig. 3. I used it in Kansas. The piece that "J. P. W." nails to the ends of the joists I throw out. Let the joists run to the outside of the sill and spike them to the studs. Between the joists flush with the inside edge of the sill I cut in pieces which hold the joists true and stop rats, mice, vermin and drafts. If two lengths of joists are used I cut these over the joints. This takes joists out of wind and keeps them so.

When I can get no square timber I make the sill shown in Fig. 4. A bond piece is bedded in the wall flush with the top and inside edge of the wall; the joists rest on this as well as the tennons; the studs rest on the edge of the 4 x 8 in. For such 2 in. plank as are used in Kansas one would want a double lip nut 1¾ in. auger. If I were building in Kansas I should use this sort of sill and would have my dealer or would myself get 3 x 8, 4 x 8 or 10 in. stuff if I needed them. Such a job will do a man more good than 100 tongues. We did this kind of work at Saranc Lake 26 years ago. All the old style joists were framed as in Fig. 5.

I prefer studs full length and get them when I can; but Mr. McMurphy's way is all right if properly done. We do that a lot here. All through this region a standard log is 22 in. diameter at the small end and 13 ft. long. This gives all our lumber 13 ft. long, and if one wanted longer stuff he would have to take his timber to special mills to be sawed. Buildings put up a story at a time stay up here as well as the others.

I prefer sheathing outside and in; if the sheathing is smooth there is no sense in wasting time lathing diagonal. I had a rough job of inside sheathing that I did not want to fur. I put the lath on vertical without breaking any joints. For such patent plasters as we have here Adamant, Ivory, and Pulp—the lath should be no more than 1 in. wide. If lath were planed the plaster could not be pounded off. Some years ago I was called in to cut a door through a partition in a building built 80 years ago. The partition was made of 2-in. plank set close up edge to edge; the lath were not furred; the mortar was lime. I had to use a cold chisel to dig the mortar off; hitting it with the hammer was like dynamiting ice.

In looking over Mr. McMurphy's early article I find a few things calling for comment. I want a

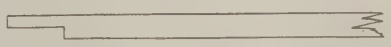


Fig. 2—A Stud for Use in Connection with Fig. 1

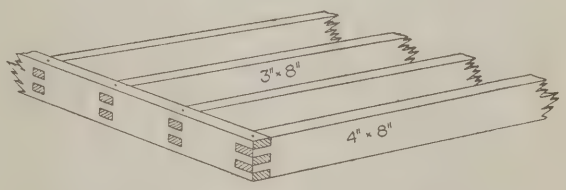


Fig. 4—Sills for a Light Timber Frame

Methods of Building Construction—Sketches Submitted by D. P. Barry

solid corner post, built up or otherwise. When I have headers to put in requiring special attention I mortise and tenon if of timber; and if of joists I put them in as in Fig. 4. All my steel squares are 18 x 24 in., a 16-in. tongue has no favors with me. I never stud walls or partitions solid. I lay off the sills with extreme care. All the openings are marked for double studs and the plates are laid off from the sills. The studs for corners and openings are doubled full length; the section is raised, the corners nailed, plumbed and braced; the opening studs are plumbed absolutely and nailed.

If I am putting up one story at a time I do not use the method described by Mr. McMurphy. I set the upper story studs on the lower story plate. I am sending a view, Fig. 8, of a frame as I put them up. His Figs. 1, 2 and 3 would not, I fear, find favor here.

Referring to his March article, the best dimensions for saw horses, in my opinion, are 4 x 6 in. 4 x 5 in., 3 x 6 in., 3 x 5 in. in the order named. With the larger size the legs may be of hard wood and put in with an auger. Legs for the smaller size should be mortised in. One can stand on these comfortably to work. We use his Fig. 3 here but we tongue or groove the ends according as we begin in the center or outside. On floors that are not level this cannot be done and corners must be dressed off as they rise above the opposite pitch.

What he calls "machine clapboards" we call "feather edge"; 4d common nails are all right for those; finish nails pull through the clapboards in this climate. I nail at random 10 to 12 in. apart; 4d are too short for the cedar clapboards we get from the Pacific coast. I never lay clapboards without gaging every one; I use a silk line frequently across the wall. Some persons line the whole wall and begin at the top and clapboard down by pushing each clapboard under the one immediately above.

When I have work to do like his Fig. 6 I do it as in Fig. 6 of the accompanying sketches. This is quickly done and equals draw bore pinning; the joint when everything is glued stays put. In Fig. 7 I show a milled outside door sill and threshold in one piece.

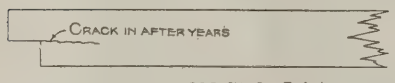


Fig. 5—An Old Style Joist



Fig. 7—An Outside Door Sill

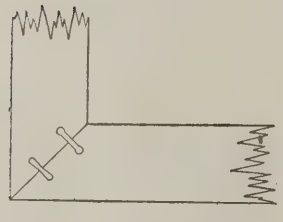


Fig. 6—A Mitre Joint

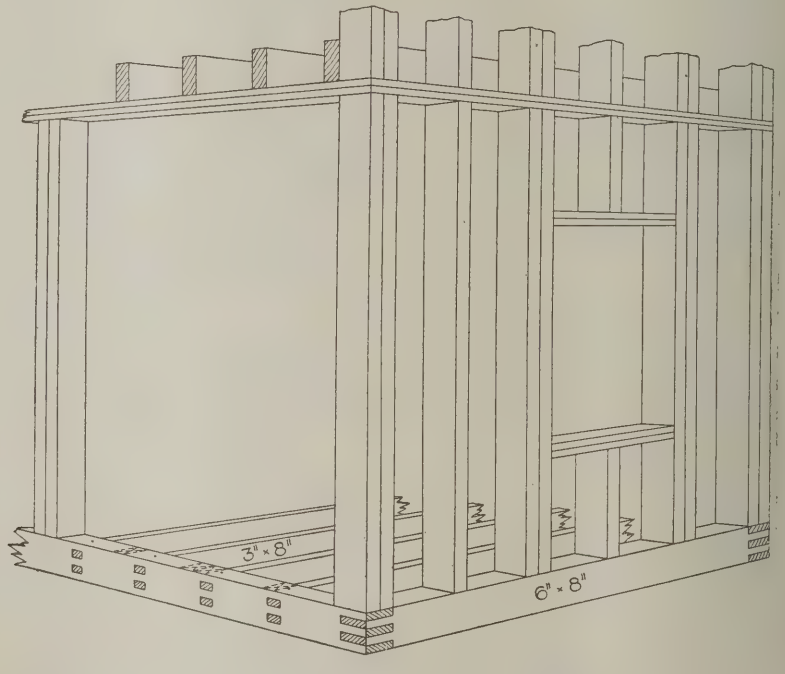


Fig. 8—An Example of Modern Framing

Methods of Building Construction—Sketches Submitted by D. P. Barry

Some Comments on Mortar for Brick Work

From W. H. Hefelfinger, St. Louis, Mo. — Regarding Norman B. Hough's comments on my article on "Mortar for Brick and Stone Masonry," I would say that his criticism seems to be based on my classing magnesia oxide in lime as an impurity, strictly speaking. I realize it is not and stand corrected.

What I meant by taking lime as it comes, was that lime being a product the quality of which depended upon the composition of the limestone before it is burned and the great variation in the composition throughout the country gives us a product of different value in different localities.

Excessive dust due to air slaking was meant in characteristics No. 2.

In the statement that poor limes should not be used in plastering, I meant those limes that are slow slaking, full of small stones and cinders or other impurities which injure the plaster.

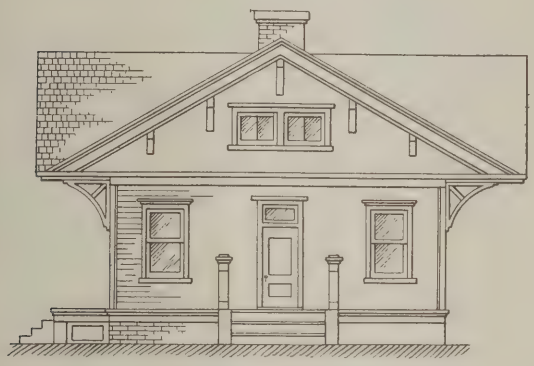
Use of Oak Flooring in a Church

From W. L. C., Chicago, Ill.—In looking over the May issue of THE BUILDING AGE I note on page 57 some comments from "Manufacturer," Rochester, N. Y., in regard to the relative merits of ⅜ in. oak flooring as compared with 5/16 in. parquetry strip which has no tongue and groove. I cannot

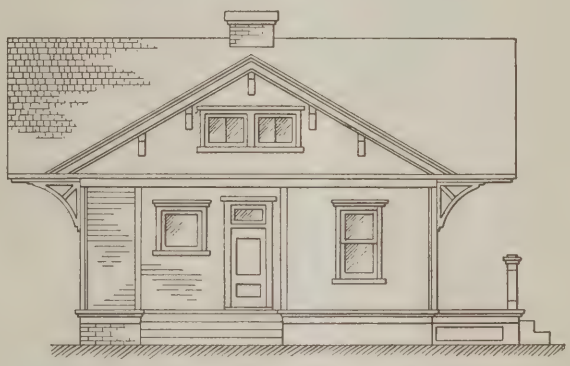
say that I agree with "Manufacturer" in regard to what he says about 3/8 in. oak flooring. The increased demand for flooring of this nature speaks well for it, but a professional floorlayer may prefer to lay parquetry strips for he has a chance to do it with less cost to himself, and several strips can be laid at a time. The 3/8 in. oak flooring is nailed through the tongue or blind-nailed and all stock is hand-matched in like manner. When it is laid it has the appearance of heavier stock and makes a satisfactory and economical floor. There are a number of churches in the city of Detroit using 3/8 in. oak flooring which is giving the best of service.

Elevations Wanted for Floor Plan

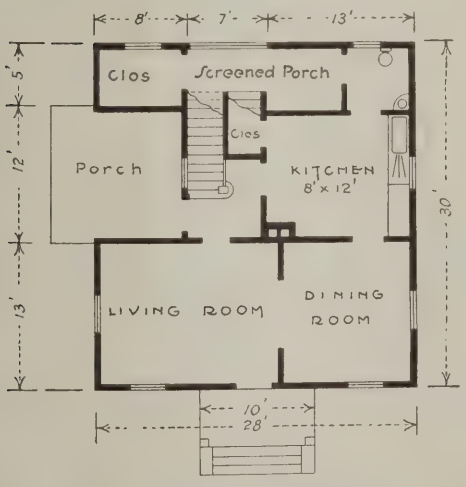
From T. T. Carter, Bluefield, W. Va.—I am sending some sketches which may be of interest to "Sawdust," Pasadena, Cal., who asked in the May issue for elevations suitable for the floor plans which he presented. I have made a few suggestions in connection with the floor plans, as will readily be seen from inspection of the drawings. The windows are so placed as to give sufficient light and ventilation on both floors and all rooms are private. The gables and cornice are broad, with brackets for supports. In this section of the country this type of residence is very popular.



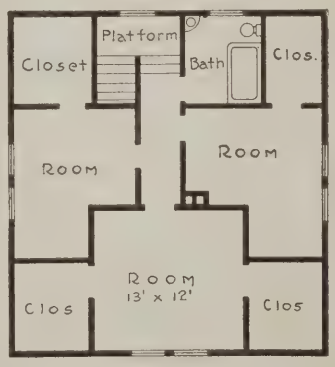
Front Elevation



Side (Left) Elevation



Modified Plan for First Floor



Modified Plan for Second Floor

Scale 1/16 In. to the Foot

Elevations for Floor Plans—Submitted by T. T. Carter, Bluefield, West Va.

Rush Time in the Planing Mill

From John Wavrek, Jr., Pa.—Acting upon the generally accepted hypothesis that it is good policy to prepare for conflict in times of tranquility, I wish to present a few things for the consideration of co-workers in the planing mill. It is well known to most of us that at certain seasons of the planing mill activities there arises a condition which looms up before the management like some horrid nightmare. I am sure the manager would at that particular period just as soon be with the Allied Armies in the trenches as to stand up before the attack of the various irate contractors clamoring for their inside finish.

The particular period which I have in mind is that which develops with tantalizing certainty each year of the building season when most of the outside work at the different jobs is finished and the contractors are ready for inside work. It is customary for the contractors to devote their energies to all outside work during favorable weather, getting the buildings under roof and generally preparing for that time of the year when the weather conditions are not favorable for outside operations. When that time arrives the demand is for inside work.

Although the wise manager anticipates this condition, and in a great measure provides against it, yet it is not possible to foresee to what extent the

condition will develop. There are all kinds of stock goods carried on hand by the planing mills of any importance, but such goods can only be used in the ordinary run of houses and will not be tolerated by the architects in the better class of work. This latter kind can only be gotten out when the details are forwarded to the mill by the architects, and also it is invariably necessary to take measurements of this kind of work on the job after the grounds are placed in position. Some contractors, knowing that this condition of congestion in the mill will arise, endeavor to get ahead of it by ordering the planing mill management to have their men take the measurements before the building is in proper shape for them, and as a consequence mistakes are made. It is never safe to take sizes before the rough plaster coat at least is applied.

It is customary to allow 1¾ in. over the size of the stud for door jambs in the regular run of plaster, which is usually ¾ in., but it often happens that the plaster projects considerably beyond the grounds and this causes the jamb to be too narrow, or the carpenter must scrape away the surplus in order to use the stock as furnished. If the carpenters object to scraping away the plaster it is likely that the mill will be notified that the jambs were gotten out too narrow. This, to my knowledge, has happened more than a few times. Here there arises a condition which places one "between the devil and the deep sea." Obviously it is not a good plan to have mill work measured up before the job is in shape to do the work right.

The question naturally arises, how can we overcome the congested condition in which the planing mill finds itself when everyone is clamoring for inside finish? For one we might suggest that if the capacity of the mill allows, get more help. Surely this seems an easy solution of the problem but upon deeper thought it is apparent that this is more easily said than accomplished. In the first place the only men obtainable during the rush season would at best be of inferior quality, otherwise they would not be out of a job. On the other hand, it would not be good policy to entice a man from his employment by offering him better wages than he is getting with his present employer.

Another method employed by some concerns is to run their plants overtime. This is a practice which certainly does not pay, as experience has proven. It is a well-known fact that if a man is made to work long hours his efficiency is greatly decreased and unless offered extra inducements he will not consider overtime work for a minute. The conscientious manager has also the welfare of his employees at heart and does not wish to drive them beyond their normal capacity because he knows it will not pay him in the end. In case there are mill men available when the rush period has arrived, it would seem that the proper thing to do would be to give them employment, but with the understanding, of course, that they be the first ones to be laid off when conditions require it.

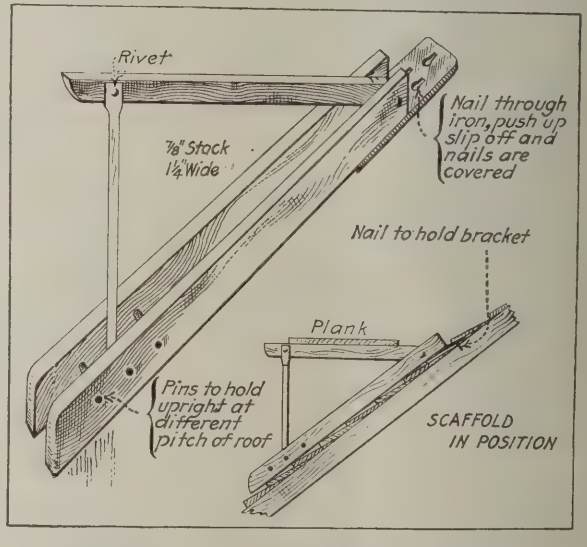
One of the objections that might be raised against the employment of more help when this rush time is on is that it tends to shorten the work for the regular men, therefore it is not apt to meet with their approval. However, that again depends on the judgment of the manager. If he wishes to run his plant for profit—and he certainly does not run it for charity—it is incumbent on him to get the most work accomplished in the shortest time possible.

From what has been said it will be seen what an unenviable position the mill manager occupies at times and that his job is indeed no child's play. The various contractors should also take into consideration the fact that their particular job is not the only one on which the planing mill is engaged and they should accordingly be less insistent. It would, perhaps, be a good plan to adopt the suggestions of the men who proposed that in order to avoid rear-end collision of trains, the last car should be eliminated, or, in other words, by making each contractor's work first, there will no last.

I should like very much indeed to hear from some of the other readers of the paper on this subject, as no doubt there are some bright chaps who can study out a good solution of the problem which I have mentioned.

A Convenient Scaffold Bracket

From S. F. A., Boxford, Mass.—In recent issues of the paper there has appeared some little comment in regard to scaffold brackets for use in laying asphalt shingles on the roofs of buildings. I am sending sketches of a folding bracket which will fit any roof and is one which I have used for 8 or 9 years. I find it very satisfactory for the



A Convenient Scaffold Bracket, as Described by "S. F. A.," Boxford, Mass.

purpose and as it costs only $5 or $6 per dozen it saves time and labor, and is very economical in the end. The sketches show so clearly the construction of the bracket as well as its application that little description would seem to be necessary. It will, however, be seen that at the upper end of the bracket is an iron plate with three elongated slots through which nails are driven to hold it in place on the roof. At the lower end of the bracket are three pins which are intended to hold the upright supporting the piece on which the plank or platform rests, and which are intended to accommodate the bracket to the pitch of the roof upon which work is to be done. The upper part of the bracket is so made that the nails hold-

ing it in place are covered by the course of shingles directly above and in order to release the bracket it is only necessary to push up on it until the nail heads register with the enlarged portion of the slots when it may be slipped off and the nails will remain covered by the course of shingles as stated. The bracket itself is about 1¼ in. below the shingle butts which give sufficient space to push up and slip off from the nail heads.

Workbench for the Carpenter

From J. F. A., Ossining, N. Y.—I am sending sketches of a workbench which I made for home use and which may possibly be of interest to some of the readers of THE BUILDING AGE. The bench is mortised, tenoned and bolted together in such a way that it can readily be taken apart by simply removing four lag screws, L, and four bolts, I, as shown in Figs. 1 and 2, which represent front and end elevations of the bench.

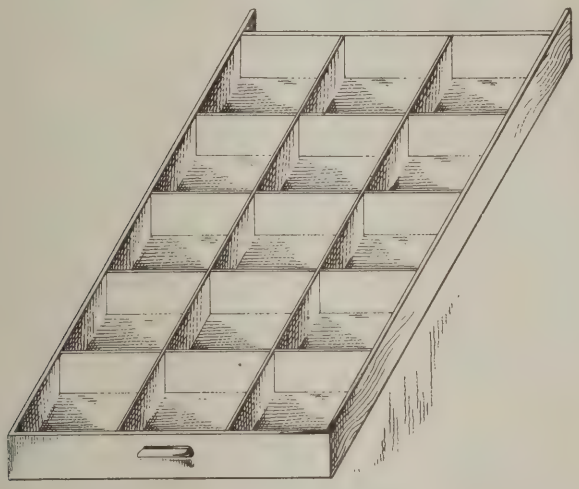


Fig. 3—Perspective of One of the Drawers for Nails, Screws, Brads, Etc.

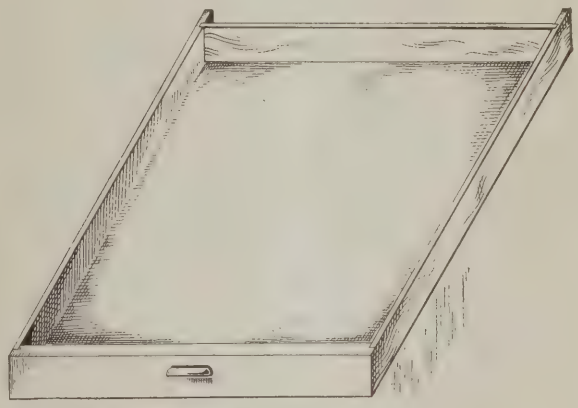
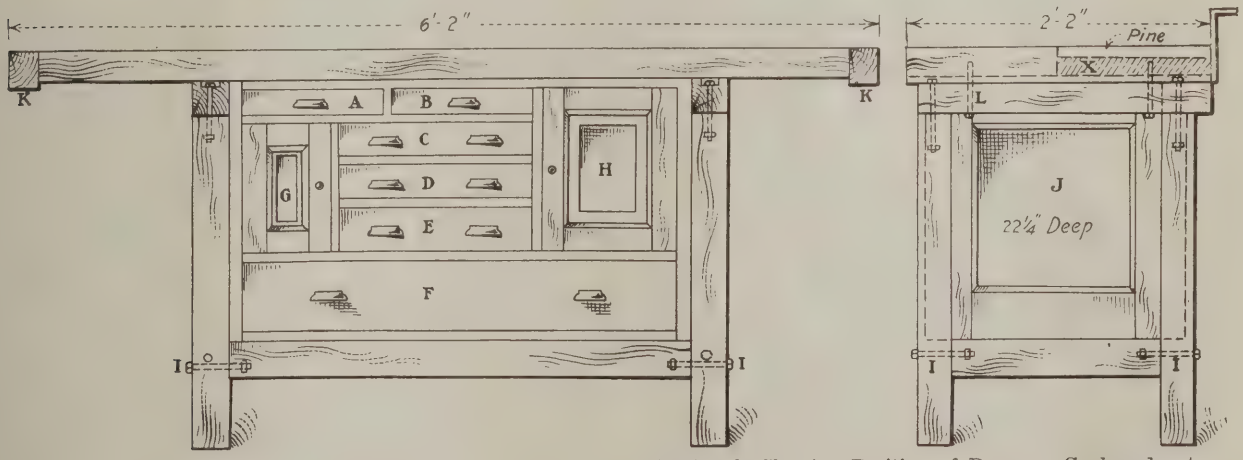


Fig. 4—Drawer for Tools



Figs. 1 and 2—Front and End Elevations of the Carpenter's Workbench, Showing Position of Drawers, Cupboards, etc.

Workbench for the Carpenter as Contributed by "J. F. A.," of Ossining, N. Y.

The cabinet is set in loose with two drawers, A and B, shown in the elevation, Fig. 1 and in perspective in Fig. 3. These are used for brads, nails and screws. The other drawers shown in the elevation can be used for tools. Cupboard G is used for set planes, and that marked H can be used for whatever best suits the owner. The drawers marked C, D, E and F are made as indicated in Fig. 4 of the accompanying illustrations.

The bench is constructed of red birch with pine back. The ends KK are fastened with stair bolts. Referring to Fig. 2, J is an end panel 22¼ in. deep in the clear. The piece X is put on to level the back and front boards as shown.

Methods of Laying Shingles

From E. M. P., Robbinsdale, Minn. — I have noticed the article in the June issue of the paper entitled "Some Aspects of Modern Shingling," and in my opinion this is a very good contribution for the people who make shingling hatchets, but as to the method of laying shingles, it seems to me that the author has got things twisted; at least so far as I am able to discover in this section of the country. Some twenty or thirty years ago carpenters in this state used a line by which to lay shingles and also a chalk line—sometimes two chalk line marks—but this method has long since been discarded and the straight-edge used—not the line. Wherever a shingling job is done with a straight-edge every course of shingles is in a perfectly straight line, owing to the fact that the butt of the shingles rests on the edge of the member which is used as a straight-edge. Every course is nailed—something which is occasionally forgotten where a line is used and when two courses are laid at a time. In our experience we have always recommended the straight-edge.

Wall Board for the Summer Cottage

Features of Its Adaptability—How It Can Be Used in New as Well as Old Cottages

WHEN the mercury begins to rise high in the tube and most city folk leave the crowded city for the cooling breezes of the seaside, or for the refreshing restfulness of the mountain woods, the carpenter feels a demand for his services for the erection of summer cottages.

For the average person, the summer cottage must be inexpensive. Usually it is of different construction from the regular frame construction, being lighter in many ways. A weather-proof roof is the essential feature.

Popular Method of Construction

The most popular method of constructing a building of this type is to use cedar post piles for the foundation, hemlock studding and siding without sheathing or paper.

When wall board is not used, the interior treatment generally consists of exposed studding and joists, or, if a smooth wall is desired, shiplap or beaded ceiling is used. Lath and plaster very seldom find a place in the summer cottage because of the increased expense due to the customary out-of-the-way location of these buildings.

The wall board interior treatment is undoubtedly the most satisfactory. It permits of the enjoyment of the exposed timber effect without the disadvantages. It is vastly more attractive than the shiplap or beaded ceiling treatment, which has a very limited field for pleasing decoration. The difficulty and expense of transporting the necessary materials for a lath and plaster treatment puts them beyond popular reach. Then, there is the two to three-week delay waiting for the plaster to dry out sufficiently to make it healthful to occupy the cottage. In winter plaster rapidly deteriorates in unwarmed rooms.

But with wall board it is entirely different. Climatic changes do not noticeably affect it; in the spring it will be found in exactly the same condition as when the cottage was closed up in the fall.

Why Wall Board Is Popular for Summer Houses

What makes wall board so much in demand for summer cottages is its resistance to the passage of heat. Even in hot weather rooms finished with it are cool, which means days of more comfort and nights of restfulness. Yet during those cold spells that seem to come from nowhere in the middle of summer, wall board will keep the rooms snug and cozy, for it is also a non-conductor of cold. On this account the cottage may be occupied earlier in the spring and later in the fall.

The accompanying drawings show complete details that will enable a carpenter to readily erect a wall board finished cottage. Notice in the wall section the wall board panels are placed on the outside of the studding in the manner of sheathing directly under the clapboards. Thereby a well-insulated wall is secured. The panels of wall board are applied to the ceiling from the top just opposite the common method. The partitions are constructed of 2 x 2 studs nailed on each side of the panels. It is of particular interest to observe the scheme of treating the corners of the wall and partition at the junction with the ceiling.

Of course, there are numbers of other ways to finish a cottage with this material, the ordinary method of nailing the panels to the studding and joists and covering the joints with decorative strips, for instance, but the method illustrated is selected for several good reasons: First, the exposed timber effect is in best keeping with summer cottage architectural style; second, ease and rapidity of application, and third, its inexpensiveness, considering that no decorative strips whatever are required, that no center nailing is necessary and that the nails on the edges need be spaced no closer than 6 in. apart. Also on all partitions one panel takes care of both sides.

Remodeling Old Cottages

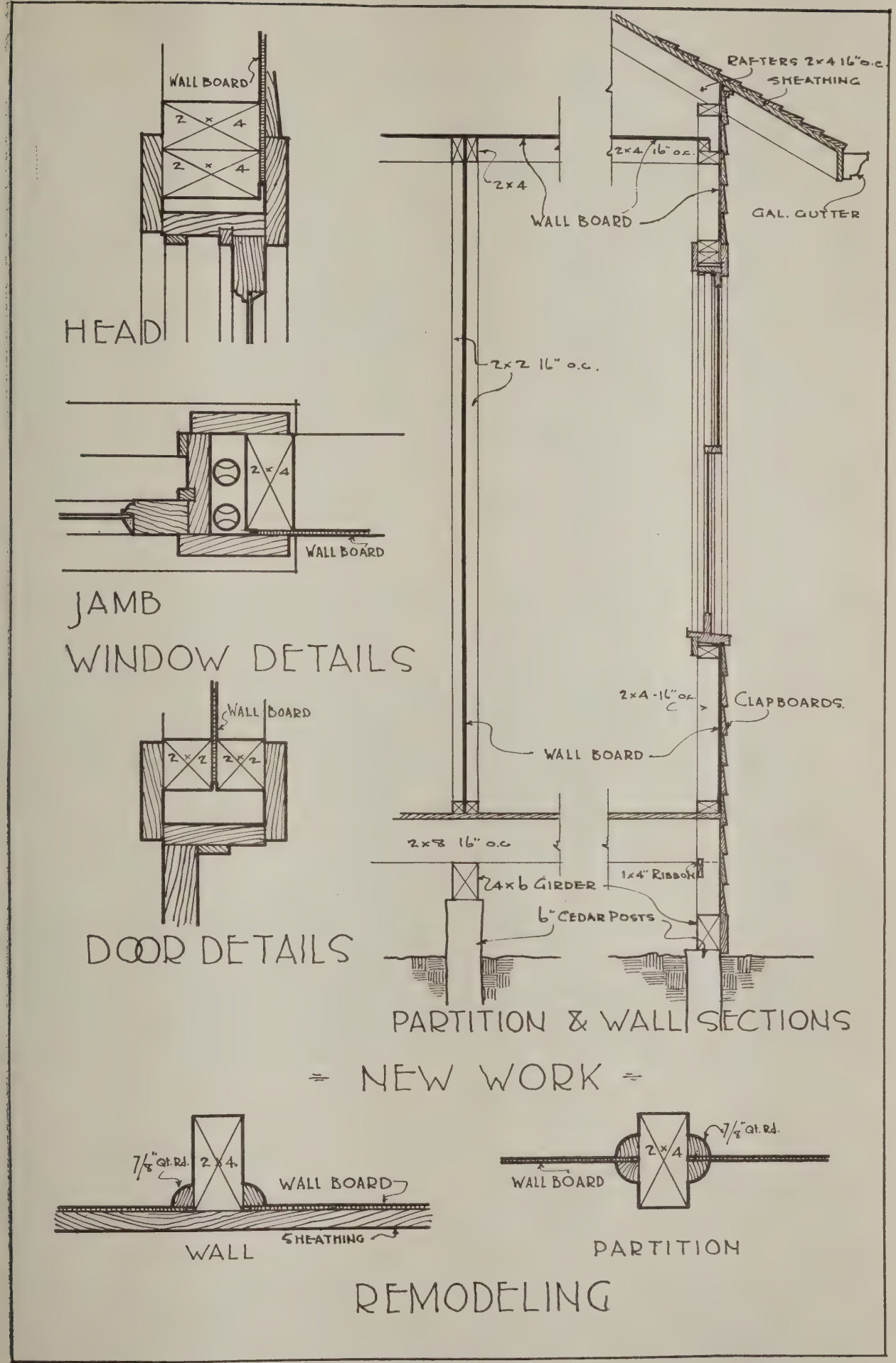
If it is desired to remodel an old cottage with exposed timbers, to obtain a smooth wall, the panels of wall board can be applied directly to the studding as in ordinary frame construction. If the walls are already shiplapped it is a very easy matter to apply the board right over it. But if the cottage with the exposed timbers is to be treated so as to produce an interior similar to that explained for new work, the carpenter is referred to the details at the bottom of the illustration.

In applying the board to partitions, the molding on one side is first fastened to the stud. The board is then toe-nailed on, after which the other molding is put on. It is not absolutely necessary to use the quarter-round molding; $\frac{7}{8}$-in. square strips could be used, with equally attractive results.

Value of a Builders' Exchange to the Building Industry

In discussing the value of a Builders' Exchange to the building industry, A. H. Shank, secretary of the Builders and Traders' Exchange of Grand Rapids, Mich., recently said among other things:

"A Builders and Traders' Exchange is in a very vital way affected by its location and environment. There can be no question that the contractors and material dealers made a wise choice when they decided to have an organization of the building industry of this community. It has meant much to the Builders and Traders' Exchange that it lives in and has done its work in a community where the spirit of organization and co-operation exists to such a large degree.



Wall Board for the Summer Cottage—Details of Construction for New Work and Remodeling

"From the very fact that our life and happiness depends upon our fellow men in like activity and that the men of this city meet it so manfully by their various organizations is an evidence of refinement and culture. On the other hand we may be permitted to say that the Builders and Traders' Exchange has contributed largely to the growth of this city. Of course it has helped in a material way, yet that has not been its chief contribution. It has played its part in the civic, social and business progress of the city. We shall cherish the hope that the future may strengthen the bond between the building public of this city and the Builders' Exchange that the men who organized and are maintaining this organization for better building and a more beautiful city will be appreciated for their contribution to our civic life. This bond is now consecrated by the memory of several years of service and sacrifice. If it is true that the entire building industry is profoundly concerned in the expanding influence of the Builders and Traders' Exchange this city must in a special sense feel an interest in its growth and prosperity.

"The past of the Builders' Exchange is secure. Its achievements are written in a large and fine way in the minds of the men who have made up the great building industry of our city and state. It has rendered a great enduring service to the building public of this city and state. This service has affected every phase of the industry from point of view of the cost of a building to that of ethical practice by those interested. The building public of Grand Rapids owes a debt of gratitude to their Builders and Traders' Exchange in view of its many achievements for better buildings and a more beautiful city. This debt they should repay not merely by expressions of pride but more especially by giving to the members of this Exchange the kind of support that its services to the city entitle it to receive. The building public should support the acknowledged head of the building industry, not as if they were dealing out charity, but as if they were increasing an investment.

"The Builders' Exchange is conscientiously meeting the demand for a higher type of building which is conceded to be the primary function of a modern city. It is not only enriching the knowledge of its membership but is studying the wiser application of that knowledge to the needs of the building public of the city. It is concerning itself with every phase of the building process and existing to serve the needs of the city. This work is going on in an atmosphere devoted to the highest ideals of moral and ethical practice.

"The Builders' Exchange does guarantee to the building public that any work intrusted to its members will be executed with honesty and integrity and urges on all men who contemplate building to insist that their material be furnished by and done by a man who has the Builders' Exchange guarantee."

A bill empowering the Board of Estimate and Apportionment to regulate the height and size of buildings in building zones in New York City has been signed by Governor Whitman. This bill makes possible the restriction of specified areas for factory purposes, etc.

Forethought in Building

It is a good plan when starting to build new premises to think of the changes which are likely to be made on the site and round about. How an owner profited by his forethought in this direction is told in the *Scientific American.* He believed that a business street running on a stiff grade would have to be lowered sooner or later, and so when he built at Los Angeles two hotels of concrete and masonry, he provided for this contingency.

The buildings were provided with ground floors that were set about 16 ft. below the level of the sidewalk. These were not mere basements, but carefully planned quarters for business purposes, and for years these quarters have been awaiting the change in grade which has just taken place.

Broadway for a block or so leading to the North Broadway tunnel was cut down from a 6 to 3 per cent grade, involving a drop of 20 ft. at the portal of the bore and a lowering of the tunnel; and before the hotels mentioned, the cut amounted to about 16 ft., the estimated distance when building was begun some years ago.

When the steam shovel began operations it would have been necessary to make extensive changes in most structures: new foundations would be required, the underpinning of the walls would be needful and in general the rebuilding would be so extensive as to disarrange the business of the hotels and drive out the guests.

In this case, however, the work had been done in advance so skilfully that little alteration was required. When excavating began on the street, a trench before one of the hotels had been already dug and workmen were engaged in surfacing the concrete walls which had been left rough, while they were below the surface. Then when the street and sidewalk were dug away by the steam shovel, the building was disclosed with a main floor added, and it was all ready for occupancy.

The Cement Industry in 1915

The shipments of natural cement in 1915 were, according to statistics compiled by Ernest F. Burchard of the United States Geological Survey, 750,863 barrels, valued at $358,627, being a decrease in quantity, as compared with 1914, of 422 barrels and an increase in value of $7,257. Shipments of puzzolan cement in 1915 were 42,678 barrels, valued at $39,801, a decrease in quantity of 25,633 barrels and in value of $23,557 compared with 1914.

Tests of Reinforced Concrete Flat Slab Structure

There has just been issued from the press by the Engineering Experiment Station of the University of Illinois what is known as "Bulletin No. 84" and relating to the tests which have been made by it to determine the action on concrete and reinforcing steel in floor slabs of the flat slab type of building construction. The data obtained have been analyzed, with the result that many new facts of interest and importance to designers and builders of concrete flat slab structure have been developed. The matter has been compiled by Prof. A. N. Talbot and W. A. Slater.

The Garage for the Private Car

A Well Designed Example with Some Unusual Features of Convenience—Details of Construction

THE phenomenal development of the automobile business which the country is witnessing is reflected in a measure in the impetus which has been given to garage construction, more especially perhaps that for the private cars of the suburbanite and the dweller in the rural districts. At the present day the car of whatever size serves for the purpose of transit for the business man, whether it be to and from commuting stations in the country, or to and from the city itself. It is at the same time a family utility which is more and more being appreciated, and a garage for its proper housing becomes at once a necessity on the part of the owner. That they are of varied design and construction goes without saying, for these features depend in large measure upon the number of cars the garage is intended to contain, and whether it is purposed to embody in connection therewith living accommodations for the chauffeur.



Garage and Residence of Mr. H. L. Condé at Syracuse, N. Y., Both Being Designed by Him and Erected Under His Personal Supervision

As being of interest in this connection we present herewith a picture and floor plan of the garage referred to at the close of the leading article in the April issue of the paper, entitled "A Cleverly Planned Syracuse Dwelling." The garage is built on a side hill, which permits an entrance in front at grade, as shown in the accompanying picture, also an entrance to the cellar at grade in the rear.

The foundation walls are of cement blocks below grade with red Pennsylvania pressed brick above. The sill is anchored to the foundation walls with angle irons.

The exterior frame is covered with 10-in. cypress clapboards stained a silver gray. The trim is white pine painted white.

The roof is of shingles stained green, with hanging gutters carried to the drain. It will be seen that 3 x 8 in. beam ends are used over the main door in "pergola effect."

The main floor of the garage provides room for two cars, with workbench, lockers for robes, clothing, etc., and a tool cabinet, all as indicated on the plan and in the detail sketch. In the portion where the robes are kept three round broom handles are used for the robe racks. Doors are provided for both the tire and robe compartments.

Electric plugs are conveniently placed for attaching extension lights for repair work. There are trapdoors in the floor at points where the cars rest, so as to facilitate any repair work that may be necessary. This, of course, saves crawling under the cars when this sort of work is to be done. The floor is of cement and is pitched to the drain outlet.

The main doors are 1¾ in. pine and measure 7 ft. 9 in. x 8 ft. 1 in. They are provided with 18 lights, each measuring 8 x 10 in., the arrangement being as shown in the picture.

There are five windows on the main floor, thus affording ample daylight, which is a very important factor. All windows swing in, being hinged at the top. The doors slide on overhead track, Richards-Wilcox ball-bearing hangers and locks being used.

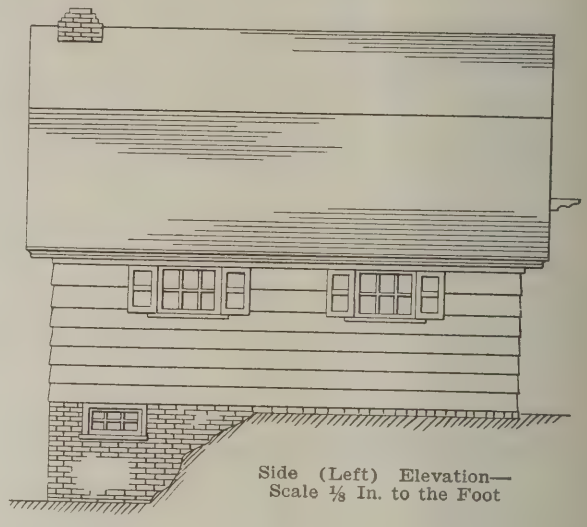
Narrow stairs are provided which lead to the cellar and also to the dove cote in the attic. A sliding door closes the stairway opening to the cellar when the stairs are not in use.

Several large windows in the rear wall of the cellar provide ample light and ventilation for the chicken room, which is equipped with nests, roosts, etc. This room also has flue connection with the chimney for using a brooder or incubator. The heater room is also in the cellar.

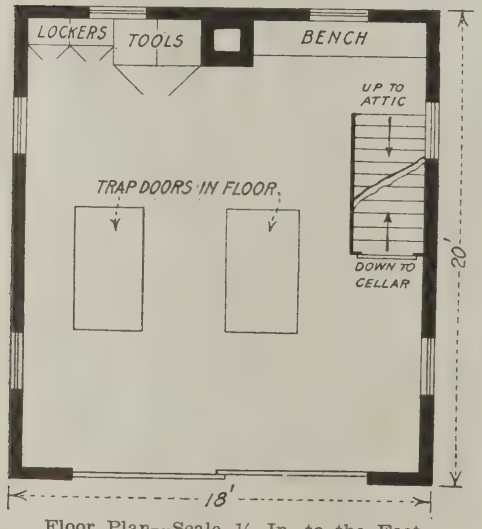
The attic is used for a dove cote and has a large window in the rear for ventilation and an outside inclosed shelf at the rear for confined birds. Openings in the front provide for other or "home" birds.



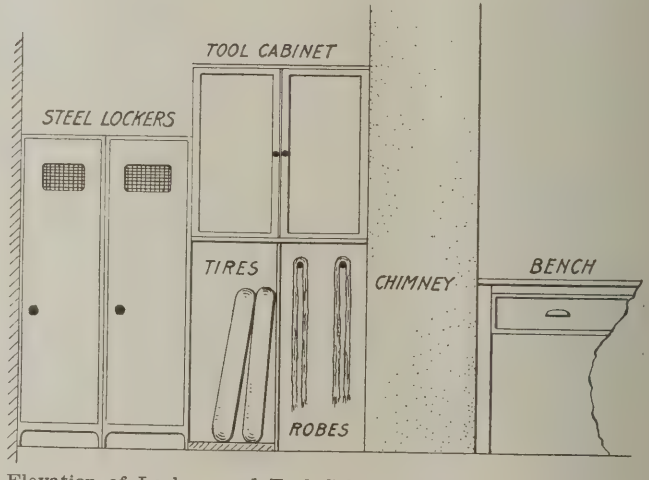
Front Elevation—Scale ⅛ In. to the Foot



Side (Left) Elevation—
Scale ⅛ In. to the Foot



Floor Plan—Scale ⅛ In. to the Foot



Elevation of Lockers and Tool Cabinet at Rear End of Garage—Scale ¼ In. to the Foot

The Garage for the Private Car—Plan, Elevations and Detail of Lockers and Tool Cabinet

The electric lights are so arranged that they can be turned on or off from the house or garage, and there is a light provided over the doorway.

The garage is that of H. L. Condé, No. 22 The Hartson, Syracuse, N. Y., and was erected from plans prepared by him.

The town of San Fernando, Cal., has just passed a comprehensive building ordinance, prescribing fire limits, providing for inspection and permits, and setting definite standards for various classes of construction, etc.

Some Hints on Stippling

The process called stippling consists simply of pounding the wet finishing coat gently and regularly all over with what looks like a large clothes brush. The stippling brush is about 3 in. x 6 in., and has long bristles.

A new, clean duster will do for stippling also. The object in stippling is to remove all brush marks and produce a uniform surface.

When a wall is to be stippled, says *Carter Times*, mix the last coat with half boiled oil and half turpentine, rather thick, and add a little japan drier. The paint sets quickly, and it is usual to work two men on a job, one to brush on the paint and one to follow closely with the stippling brush.

Use a 4-in flat brush and apply a full coat quickly, covering the surface as well as possible without any effort to avoid brush marks and lay on the paint evenly. The stippler will distribute the paint evenly and eradicate the brush marks.

Do not miss stippling any places and do not stipple the same place twice. Do not allow the edge of a stretch to set.

Construction of Old English Roofs

Conclusion of the Lecture by the British Architect, Arthur Keen, Commenced in the June Issue

OUR English carpenter was a man of remarkable initiative, and he was ever experimenting with new forms and methods. He realized early that the form of the stone arch might be adopted in woodwork, and he did adopt it freely and fearlessly, taking care to throw the ultimate thrust as low down as possible, because the walls that carried his work were high and were not strengthened much by buttresses. The arched form is not merely very pleasing in itself, but the ribs of timber, that form the arch, tie and bind into one solid construction the principal rafter, the wall pieces, and the cellar beam if there is one, near the apex of the roof, so that they are as if cut out of one piece of wood unbending and without thrust.

A modern timber roof truss depends entirely on two great factors: one, that timber cannot stretch, and the other that, used in short lengths, it cannot bend. The modern method was not used, as far as I know, in medieval England, although in France it was adopted freely in forming the roofs of the cathedrals, and the wonderful timber fleches that adorn the crossing of some of the French cathedrals and tower up 120 ft. or more clear above the roof were carried by timber trusses formed on the principle that we now employ. The fleche at Amiens covered with lead and weighing an enormous amount is fully 150 ft. high, and stands above a roof that is 160 ft. high off the floor and there it has stood for four centuries.

The Hammer-Beam Roof

One of the most skilfull contrivances of the medieval carpenter was the hammer-beam roof. In the early trussed rafter roofs there was, as I have pointed out, a triangle at the foot of the rafter which resisted outward pressure or spreading of the roof. In a hammer-beam roof this triangle becomes much larger—it projects boldly out from the wall, and is upheld by a slanting prop or brace jutting out from a wall post below. The triangle thus supported becomes immovable, and the roof therefore cannot push the walls outward. This method, once established, was recognized as a triumphant success, and it was used in the most fearless manner with all kinds of developments and modifications. The splendid possibilities of decorative treatment that it offered were seen at once and full advantage was taken of them, while the possibilities of interchange and variety among the many parts that composed the truss gave the opportunity forever fresh treatment. If you go through the Norfolk churches you realize that the same carpenter must have worked in many of them and yet the roofs are never alike. In some the arched ribs go right up to the top, in others they meet under a richly ornamented collar beam; sometimes the hammer-beam is long and sometimes short. And the carved and molded work takes endless forms—saints and kings are carved on the wall posts, angles on the ends of the beams and along the cornices. Carved crestings adorned the cross beams; bosses and battlement-carved leaves in the spandrils and splendid color decoration make these roofs a marvel and a glory.

Timber Roof of Westminster Hall

The finest construction of this class that we have, and altogether the most wonderful timber roof ever made, is the one at Westminster Hall, and a strange thing about it is that it was the first roof of its sort to be made—not merely the first with the great arched rib running up through the whole construction, but the first hammer-beam roof. The work of re-roofing Westminster Hall was begun in 1395, the materials having been got together during two years previously. An interesting commentary on the social conditions of the time is to be noted in the fact that Godmeston, the clerk of the work, was authorized to take the necessary masons, carpenters and laborers required wherever found, and to arrest and imprison those who resisted. The mason was also to "arrest" carmen, horses and carts, and ships and mariners for conveying the stone.

The same system is shown by the fabric rolls to have been in operation in the building of Westminster Abbey in Henry III's reign, and it hardly bears out the theory of enthusiastic Churchmen who believe that the great works of medieval times were built by the monk's themselves out of sheer devotion and love, and without remuneration, although they have never told us how the monks learned their craft. Westminster Hall was built in the reign of William Rufus in 1097, and the original roof was in two or more spans, probably three. The walls were raised 2 ft. in Richard II's reign in preparation for the present roof. There are contemporary documents that give particulars of the purchase and carriage of materials, and all the arrangements for executing the work. The span between the walls is 69 ft., and the principals are 20 ft. from center to center. The complexity of the construction, combined with the huge size of the oak timbers used in it, makes the roof an amazing production. For instance, the great collar beam of each truss is a huge log of oak 38 ft. long and more than 2 ft. deep, and it had to be got into position 66 ft. above the floor.

Everything else is on a similarly huge scale, and one stands astonished at the courage and resource showed by these old carpenters who could not only conceive such a thing, but who carried it out with such accuracy and precision of workmanship that they might almost have been handling the stuff on a bench in a workshop. The mere constructive and executive problem was stupendous, but these men

looked far beyond this side of their task; they were artists, and they made their work so beautiful that one does not know which to admire more, its constructional sufficiency or the beauty of its appearance.

The decorative work is of the finest kind, and the great sculptured angels bearing shields at the ends of the hammer-beams are some of the most perfect carved work in wood that I have ever seen.

Another roof that is interesting to dwellers in London is that at Eltham Palace, monumental in its size and the richness of its detail. It is not as sound in its design as the Westminster one, and it has failed a good deal. Neglect has played havoc with it, but it has now been taken in hand by the Office of Works, and will no doubt go on for many a year. The roof dates from the fifteenth century.

Cracking and Discoloration in Stucco Surfaces

The application of a sand-finish stucco that will not crack or discolor is a problem that has perplexed many a builder and the views of such an authority on the subject as William M. Kinney, engineer for the Universal Portland Cement Company, presented in a recent issue of *Concrete*, cannot fail to prove of interest to building contractors in all parts of the country.

He states that checking and cracking of a sand-finished stucco surface can be minimized by careful attention to details but discoloration is a matter which it is harder to overcome. It is a far more difficult matter to prevent discoloration on sand-finished surfaces than on surfaces which are given a rough-cast finish. The latter can be applied rapidly enough to complete the whole side of a house in a day's time and when once applied, needs no further manipulation. A sand finish, on the other hand, requires more time and smaller areas must be gone over in obtaining the proper texture, so that the chance for discoloration is greatly increased. Although much depends upon the use of a properly proportioned mixture, the result is largely a matter of manipulation. A great deal depends upon the skill and thoroughness displayed by the workmen. The manner in which the workmen trowel the surface will influence the color. Sometimes different shades may be seen similar to those noticeable on the surface of a newly completed sidewalk, half of which has been finished from one side and half from the other.

Overworking and overtroweling of a sand finish will bring too much of the fine material to the surface and, as in the case of sidewalks and floors, will cause trouble through checking and cracking. Overrichness of mixture is another cause of trouble and we believe that for a sand-finished stucco surface, the finish coat should generally be mixed in proportion of 1 sack of cement to 2½ of fine aggregate.

One experienced plasterer has suggested that when the finish has been applied, floated and troweled, the workman go over the surface after the finish has begun to harden, using a float covered with soft carpet or felt, in order to even up the appearance of the wall both as to texture and color. In this way he believes surface checking can be overcome, and the chance of discoloration greatly lessened.

Hot sun or winds produce rapid drying of stucco surfaces, which results in checking to a considerable extent; under such conditions the surface should be protected by hanging wet blankets in front of the wall and keeping them wet for several days, or by spraying the wall with water frequently after it has hardened sufficiently to prevent injury.

In discussing the same problem, J. M. Gibson of the Clinton Wire Cloth Company also contributes some interesting information. He says that outside stucco should never finish less than 1 in. thick. That allows ⅜ in. for a scratch coat, ⅜ in. for a brown coat and ¼ in. for the finish coat.

The utmost care should be exercised in selecting the sand for stucco; it must be absolutely free from loam or any organic matter. Not only will dirty sand prevent the proper curing of cement, but it will discolor the fresh coat. Sand used in stuccoing should be clean, coarse and angular, the cement of the best brands obtainable, and if lime putty is used, it should be well seasoned and not to exceed 10 per cent. The best hair binder or fiber should be used in the scratch coat, but it is not necessary in the brown coat. Before applying one coat on another the preceding coat should be scarified, scratched and thoroughly dampened so as to prevent the absorption of water from the new coating.

In applying the finish coat, to obtain what is known as a sand finish, a slight excess of sand is used in the mixture, and the plaster is not allowed to get very wet. The sand should be large-grained and coarse.

It is not well to trowel the external coat too much, as it is apt to cause the plaster to crack and scale off. All cement surfaces will ultimately develop incipient cracking or hair-cracks. In a rough-sand finish these cracks do not show except on close examination.

If the above specifications are followed, good workmanship and absolutely the best of materials are used with a special emphasis on clean, coarse sand, there should be no trouble in obtaining a stucco exterior which will become more beautiful as time goes on.

A Unique Broadway Building

When the new subways were planned in lower Broadway, New York City, it was necessary to demolish the southern half of the old historic Astor House at Broadway and Vesey Street, leaving the northern half with the main entrance intact. Now the section of the old Astor House which formed the entrance is to be utilized as the site of a one-story structure with a façade of marble and to be used as a cigar store. The plans have been prepared by architect Frederick Putnam Platt, 1123 Broadway, New York City.

Bricklayers were the highest paid men in the building industry in Michigan during 1915, according to figures just made public by Labor Commissioner James V. Cunningham.

The largest tree in the United States is said to be the "Mother of the Forest," a giant redwood in the Calaveras big tree grove in California. It is supposed to contain 140,619 board feet of lumber.

Sewage Disposal for Isolated Houses

A Concrete Plant Involving the Septic Tank—Some Details of Construction—The Sand Filter

By H. Colin Campbell

FOR a long time cesspools were considered the only solution of the sewage problem for isolated country homes and on the farm. In view of the possible contamination of streams by house wastes the practice of discharging such wastes into streams is not to be considered for a moment. A cesspool, even though tight and closed at the top, possesses many drawbacks, one of which is the disposing and handling of its contents when the cesspool must be cleaned; also, if the construction is not watertight, the liquids will seep through into surrounding soil, and may in that way contaminate well water.

Probably the most efficient and practical solution of the isolated house sewage problem is a properly constructed septic tank, such as is detailed in Figs. 1, 2 and 3. This tank is designed to operate wholly along natural lines; that is, no chemicals are used, reliance for efficiency being based upon the development and action of bacteria, which act upon the sewage in a natural way to liquefy solids and semi-solids, and to otherwise purify the effluent.

A septic tank should be located not nearer than 50 ft. to the residence (100 ft. would be better), and the pipe carrying the sewage from the house to the tank should have a fall of at least 1 to 40.

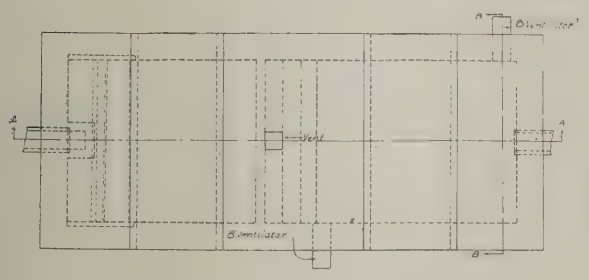


Fig. 1—Plan View of the Septic Tank

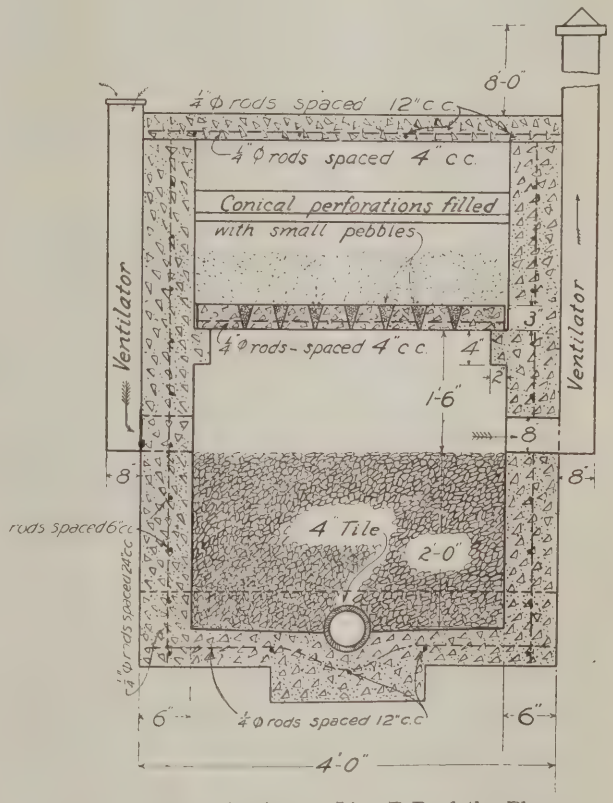


Fig. 2—Section on Line B-B of the Plan

Sewage Disposal for Isolated Houses

A grease trap should be installed to separate grease from the kitchen sink waste before the sewage enters the tank, so as to prevent clogging the tank with grease. Sewage enters through a 4-in. inlet shown at the upper left-hand corner, the incoming flow first being deflected by a 2-in. baffle board of reinforced concrete, and the current being further modified by three current breakers immediately below the baffle board at the intake. This method keeps the liquid in the first or sedimentation chamber as nearly motionless as possible, this being necessary to prevent disturbing the scum on the surface, which is essential to the growth and activity of the bacteria that modify the sewage in this compartment. Surface level of contents is always maintained at a fixed point, 6 in. below the top of the tank, the automatic outlet being at the right of this chamber and discharging over a 4-in. reinforced concrete weir wall to the sand filter in the right-hand compartment.

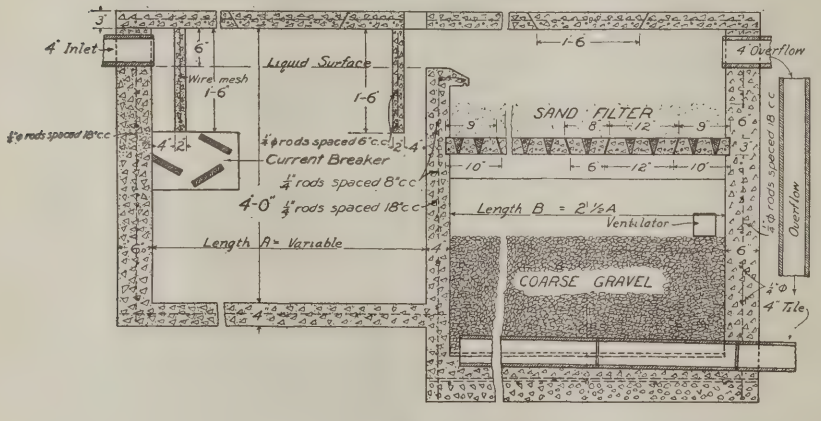
The accompanying design is based on the assumption that if the first or sedimentation chamber is 4 ft. long, it will take care of 50 gal. of sewage for each member of a household of six persons daily. If a family of eight is to be served, the length "A" should be 5 ft. It is assumed that one day will be required for liquids to pass through the sedimentation chamber under the baffle and over the weir upon the sand filter. The 1-in. x 6-in. current breakers are set in such a position that they will break up eddies and currents caused by the rush of incoming sewage. These boards are secured in position by toe-nailing at the ends to small pieces of lumber set into the walls when concrete is being placed.

The length of this tank should be increased 1 ft. for each additional person to be accommodated in the household. The method of construction is simple. If the ground is hard and firm, and the ex-

cavation made with reasonable care, no outside forms will be necessary, and concrete may be placed between the earth and inside forms, which are built box-like. After the reinforced concrete walls and partitions have been constructed, a "floor" form is then built underneath the desired level of the reinforced concrete top. This top or cover slab should be cast in separate pieces made to fit snugly when put in place, and provide for a manhole opening to allow access to each chamber. After the concrete is thoroughly hardened the manhole covers are lifted, the wood forms knocked down, and the boards removed from the manholes.

The baffle wall extends down from the cover slab a distance of about 1 ft. 6 in., and is 3 in. thick. It has a width equal to that of the inside width of the tanks (3 ft.), and is strengthened by means of ¼-in. reinforcing rods, spaced 6 in., center to center, both vertically and horizontally.

Between the two chambers there is a weir or dividing wall 4 in. thick, extending from the floor to within 6 in. of the cover slab. This wall is provided with a lip so that the sewage cannot trickle along the wall but will pass through the sand filter. This lip is reinforced by bonding the ends of the vertical rods in the weir wall at right angles to it and by one horizontal rod near the edge of the lip.



Sewage Disposal for Isolated Houses. Fig. 3—Vertical Longitudinal Section on Line AA of the Plan

As will be seen by an examination of Fig. 2, the sand filter is 6 in. deep and two and one-half times the length of the sedimentation chamber. It is supported by a 3-in. concrete slab, 35 in. wide, divided into three sections reinforced with ¼-in. round steel rods, and contains a large number of conical perforations. These are made in the slab by setting conical pieces of wood into the concrete before it has had time to harden in the form. When the slabs are placed, these perforations are filled with small irregular-shaped pebbles to prevent the sand from passing through to the gravel filter below. A 3-in. ledge projecting from the side wall serves as a support. The three sections permit easy removal in case it is desired to secure access to the gravel filter.

To prevent liquids that are to be filtered from running along the side wall, two end pieces of the above slab are set in shallow niches, in which clay has previously been daubed to form a tight joint. Clay may also be used to fill the opening between the ends of the slab and the side walls, as the slab is made of lesser width than the chamber to permit easy removal.

The effect of perforating this slab is to cause the filtered sewage to be sprinkled upon the gravel filter below; and, as it falls, it passes through an 18-in. air space, which is ventilated by means of air shafts at opposite sides of the structure. A difference of at least 8 ft. in height of these air shafts is advisable so as to create as much draft in the upper portion of the gravel filter chamber as possible. A ventilator placed upon the taller shaft will also assist to this end.

The gravel in the lower filter should be screened and well cleaned before placing, as it is desirable that the sewage be freely aerated as it passes downward toward the tile which drains the plant. Air which enters by means of this tile also serves to supply air to the gravel bed.

A "quaky" mixture, consisting of one sack of Portland cement, 2½ cu. ft. of clean, coarse sand (all passing a ¼-in. sieve), and 4 cu. ft. of screened gravel or crushed stone, varying in size from ¼ in. to 1 in., should be used for all of this concrete construction. Concrete should be well spaded next to the forms to give the concrete a smooth, dense surface. The size of reinforcing rods and their spacing and location are all shown on the design in such a manner that there need be no doubt as to these features of construction.

The sand filter should be cleaned out once each year, this being the only portion of the tank which requires cleaning and attention after once put in operation. Tanks of this design have been built and operated during the past three years, and prove that the theory of operation and results attained are practicable and most satisfactory.

If the natural slope of the ground permits of dropping the entire septic tank slightly below the surface, flower beds or lawn may be made to cover site so that the ventilators will be the only portion of the construction appearing above ground.

A word of caution should be given to those persons who are inclined to accept any design as meeting septic tank requirements. Many of the designs offered are nothing but cesspools built in two compartments, in both of which the sewage remains at constant level and passes through and out of the tanks in a continuous trickling flow without having undergone the changes or modifications intended by nature to render the discharge practically harmless, as results in a well designed septic tank. Of course, the effluent must be distributed by means of tile sub-irrigation laterals that will allow nitrification of the discharge when scattered through a considerable area of soil.

One of the ways in which wood flour is utilized is in making composition flooring. The species of wood most used for making the floor are spruce, white pine and poplar.

Current News of Builders' Exchanges

Various Matters of Special Interest to Members of Building Organizations Throughout the Country

Building Exhibit of Detroit Exchange

THE Builders' and Traders' Exchange of Detroit, Mich., formally opened to the public on June 1 its permanent building exposition on the fourth floor of the new portion of the Penobscot Building. More than 5000 special invitations were issued, including those to members of the Board of Commerce, Detroit Real Estate Board, Employers' Association, local architects, public officials, etc.

The color note of the interior trim and furniture was mahogany, each of the sixty displays having a gold lettered mahogany sign over it, giving the name of the exhibitor and the product manufactured.

Some of the exhibits were decidedly clever. The Lumbermen's Association had two miniature houses, complete in exterior detail with glass windows, trees and lawns made of real moss, etc. The Brick Manufacturers' Association showed a small house built of brick and tile, with wood trim. There was also on display a large number of stoves, ranges, furnaces, fireless cookers, built-in cabinets, refrigerators, incinerators, panelled doors and also marble, mosaic and artificial marble exhibits, etc.

On the opening day a public reception was held from 11 a. m. to 10 p. m., during which light refreshments were served. Music was furnished throughout the afternoon by a good orchestra.

The Exchange quarters were decorated with palms and cut flowers were given as souvenirs to the ladies.

The members will hold their annual outing this year at Put-in-Bay on Wednesday, June 28.

Outing of Flint Exchange

The Builders' and Traders' Exchange of Flint, Mich., enjoyed their first annual outing as an organization on June 1, when they went to Detroit to attend the formal opening of the Permanent Building Exposition of the Builders' and Traders' Exchange of that city. A special car was chartered and the arrangements were such that the enjoyment and comfort of those who participated were carefully considered. The committee having charge of the arrangements for the trip were President Smith, A. R. Dubois, James A. Gable and Harold Roe.

At the bi-monthly meetings of the Flint Exchange special topics of interest are discussed, and at one of the recent meetings an interesting talk was given along technical lines regarding paints, oils and varnishes by Harold Roe of the well-known firm of Barnea & Roe. At another meeting a talk was given by Mr. Vandenburg on "Building Materials."

New Home of Minneapolis Builders' Exchange

The members and officials of The Builders' Exchange of Minneapolis, Minn., are considering the scheme of erecting an imposing structure especially designed to meet the varied requirements of the organization. The prime movers in the enterprise are E. E. Leighton, James Ralph, James Leck and Edward Nordbloom, who constitute the committee appointed for the purpose. This committee is being substantially aided by President Walter Thorp of the Exchange and Secretary Eugene Young.

It is understood that the idea of the committee is to have one floor of the building devoted to offices of members of the Builders' Exchange, each to have direct telephone connection with the switchboard of the Exchange. It is intended to have the entire top floor occupied by exhibits of builders' materials of all kinds, this location being selected owing to the opportunity for effective natural lighting by means of extended skylights in the roof.

Annual Election of Portland Builders' Exchange

The members of the Builders' Exchange of Portland, Ore., held their annual meeting May 3, when the following directors were chosen to serve for the ensuing year: J. S. Seed, R. A. Hume, Oscar Wayman, James Griggs, W. H. Chambers, R. F. Arndt, Frank Stebinger, E. E. Gilmer, A. J. Bingham, Thomas Muir and F. L. Le Doux.

At a meeting held the week previous reports were presented by President Seed, Manager O. G. Hughson and other offices of the Exchange. That meeting is said to have been the largest and most enthusiastic which has occurred in the histor yof the organization.

Lynn Master Carpenters' Association

The new quarters of the Master Carpenters' Association of Lynn, Mass., were formally opened on the evening of May 25, when it is said every master builder of the city was present. A committee was chosen to arrange for an outing for June 24, and officers for the ensuing year were elected as follows:

President.....John J. MacDonald
Vice-President.....William Timmins
Treasurer.....L. D. Litch
Financial Secretary.....Joseph G. Fadden
Recording Secretary.....George Shattuck
Reading Clerk.....George H. E. A. Davis

The meeting submitted for discussion the no-strike-no-lockout agreement between the Master Builders and organized labor, which had previously been adopted by the Carpenters' District Council and by the main body of the Building Trades Council.

New Exchange at Little Rock

The leading concerns in Little Rock, Ark., to the number of fifty-three, held a meeting at the Masonic Temple Building on the evening of May 23, when the Builders' Exchange was organized with the following officers:

President.....William Peterson
First Vice-President.....Charles Mackey
Second Vice-President.....Charles Faubel
Secretary.....H. D. Ream
Treasurer.....J. T. Hornibrook

The officers, together with representatives of all allied trades, including general contractors, carpenters, painters, plasterers, tinners, decorators, roofers, electricians, cement workers, etc., will constitute a Board of Directors to have general supervision of the affairs of the exchange.

Buffalo Exchange Gives a Unique Dinner

The members of the Builders' Association Exchange of Buffalo, N. Y., recently enjoyed a rather unique affair, which was known as a Dungeon Dinner. This did not necessarily mean that the members ate their dinner in a dungeon, but rather, that clad in chefs' white aprons and caps and seated at individual tables made of boxes covered with white cloth, they consumed large quantities of juicy beefsteak, and during the progress

of the meal were treated to a cabaret show of high quality. The committee having charge of the affair were heartily congratulated upon the success with which the program had been carried to completion, and members are looking forward to something more of the same sort in the not very distant future.

Election of Los Angeles Exchange

The Builders' Exchange of Los Angeles, Cal., held its annual election May 19, this being the first under the new plan of organization, by which members are classified according to trades. Two tickets were in the field and the election resulted as follows:

President.....J. H. Bean
First Vice-President.....M. A. Burns
Second Vice-President.....W. R. Simons
Treasurer.....John Griffin
Secretary and Manager.....Walter Risk

The vote cast was unusually large. It was also voted to empower the Board of Directors to confer honorary membership upon individuals, firms or corporations in any line of business, such membership having previously been limited to architects.

The new officers were installed at the annual banquet, held June 15, at the Hotel Stowell.

Meeting of San Francisco Exchange

The Builders' Exchange of San Francisco, Cal., had quite a spirited annual election, and while the nominations for directors included a number of new names, in whose behalf some campaigning had been done, most of the old guard were re-elected. Those chosen were: H. Maundrell, J. D. McGilvray, Jr., E. J. Brandon, C. W. Withington, Alex. Mennie, R. J. H. Forbes, William Hayes, F. P. Fisher, E. S. Rainey, Henry Jacks and George F. Forderer.

The Exchange lost a popular member in the recent death of John W. Miller, a prominent contractor of the city for many years. He was associated with the erection of numerous buildings, including the Merchants' Exchange, the French Hospital and the Golden Gate Park Museum.

Election of Saskatoon Builders' Exchange

At the recent annual meeting of the Saskatoon Builders' Exchange, District of Saskatchewan, Canada, the following officers were elected:

President.....James Priel
First Vice-President.....A. W. Cassidy
Second Vice-President.....A. E. Richardson
Treasurer.....Andrew Rutherford
Secretary.....M. R. Pout

It is interesting to note that this is the fifth term for Mr. Priel as president. In reviewing the work for the year, Secretary M. R. Pout stated among other things that in Canada "the outlook for the present year is brighter than it has been for some time."

New Officers of Toronto Builders' Exchange

At the recent annual meeting of the Builders' Exchange of Toronto, Canada, the following officers were elected:

President.....S. R. Hughes
First Vice-President.....W. E. Dillon
Second Vice-President..... Walter Davidson
Treasurer.....John Aldridge

Arthur E. Flower, Secretary for the past three years, was tendered the hearty thanks of the retiring officers for his efficient work during 1915.

Coming Outing of Pawtucket Exchange

Arrangements are under way for the first annual outing of the Builders' and Traders' Exchange of Pawtucket, R. I., on July 19. Luncheon will be served at noon and at 4 o'clock the clambake will be opened.

The annual outing of the Master Builders' Association, which is now combined with the Exchange, has always been an event that local contractors and builders have looked forward to with keen pleasure, for without exception a good time has been provided. So every member of the Exchange is planning to attend this season's outing.

New Publications

Modern Plumbing Illustrated. By R. M. Starbuck, 407 pages, size 7½ x 10½ inches. Fifty-eight full-page plates. Bound in cloth. Published by the Norman W. Henley Publishing Company. Price, $4.

This is the third edition of a book which was designed to cover as far as possible the entire field of plumbing. It takes up not only plumbing as practised in towns and cities under strict plumbing regulations, but plumbing construction under conditions obtaining in country districts, where the problems which arise are often of an entirely different nature since there may be no public regulation of sanitary work.

Many readers have at different times expressed a desire to know more about the subjects which are explained in this book, and they will therefore find much valuable material to interest them. The author treats lucidly of the construction and use of cesspools, construction and action of the septic tank, automatic sewage siphons, underground disposal of partially purified sewage, pneumatic systems of water supply, hydraulic and double-acting rams, pumps, water supply by siphonage, pumping by windmill, hot water supply, protection of pipes against freezing, the softening of hard water for domestic purposes, etc.

Bungalows. By Henry H. Saylor. 209 pages; size, 7½ x 10¼ in. Illustrated by photographs and plans. Bound in cloth. Published by McBride, Nast & Co. Price, $2.00.

The bungalow, now so popular as a summer home with those who desire to spend the warmer months of the year untrammeled by the artificialities of city life, possesses artistic possibilities worthy the trained attention of any builder or architect. Its characteristic rural air is not generally obtainable without careful study of existing types in various parts of the country. The book under review, now in its second edition, aims to provide material which will facilitate a proper planning and building of these attractive homes. Numerous photographic views depict the exteriors and interiors of many typical examples, accompanied by plans of the more characteristic.

A chapter entitled "The Fireplace" describes the construction and proper proportions of the integral parts of an open fireplace. The use and equipment for acetylene gas, electricity and gasoline vapor as individual plants in connection with the lighting problem are also briefly described. A chapter entitled "Water Supply" tells of some of the more common ways of obtaining water when there is no main to be tapped. Septic tank construction is treated of in the chapter on "Sewage Disposal," while instructive material of architectural interest is contained in the chapters on "Bungalow Types," which explain the types best suited to certain locations. Other chapters deal with "The Plan," "Foundations," "Wall Materials," "Roofing Ma-

terials," "Interior Finish," "Furnishing" and "Planting,' the last named chapter describing what flowers to plant so as to secure blossoms of one kind or another from early spring to late autumn.

Practical Cost Keeping for Contractors. By Frank R. Walker, 273 pages, size 4½ x 7. Illustrated by 159 cost sheets, etc. Bound in cloth. Published by the author. Price, $2.

It is a matter of vital necessity for any man engaged in business to keep an accurate account of expenses and especially is it so for the builder or contractor, who must verify his estimates and know the exact cost of every item if he is to make a success of his work. He will make mistakes of course, but he has no desire to take a chance on making the same mistake over and over. It has been said that a man's success is built up of mistakes, but naturally these mistakes must be known and remedied if fortune is to smile on the ambitious man.

The book under review has been written by a man who has kept time on many jobs and who has had much experience in collecting and compiling cost data on different classes of construction work. The book is therefore the result of actual practice, not theory alone. The author considers that costs should be stated in the quantity of each class of work a man will perform per hour or per day and not in dollars and cents, for it is well known that costs in money vary considerably according to the locality in which the work may be done.

The purpose of the book is to impart to contractors, timekeepers, superintendents and foremen the essentials of accurate cost keeping and to give the methods to be employed by which the maximum results may be obtained with a minimum of labor in bookkeeping. For this reason all the forms and blanks that may be required on any job or in the contractor's office are said by the author to be illustrated and described. In each instance the origin, together with all steps necessary to gather and compute the data from checking the time, subdividing the different classes of labor and arriving at a basis for satisfactory units, are explained, tending to make the costs reliable and dependable. There are also given estimate sheets, estimate summary sheets, daily construction and material reports, labor cost records, material cost records, etc., together with the special forms required for hollow tile fireproofing, rough carpentry, masonry, electrical work, painting, as well as a large number of other subjects.

Brief Review of the Building Situation

Building Operations for May in 137 Cities Show an Increase of 25½ per Cent Over May, 1915

THE building season is now in full swing, and activities in all parts of the country show a gratifying increase in the volume of building operations as compared with the corresponding period a year ago. The most important gains are found in the cities of the Middle and Southern States, although reports from all sections indicate that work is proceeding upon a large scale, relatively speaking. While the high prices of many of the materials entering into building construction have caused important projects to be held up, the great volume of building in the way of dwelling construction throughout the country is more than enough to offset this.

In the Eastern States, reports from fifty-two cities show an increase in the value of building operations for which permits were issued in May, as compared with the same month a year ago, of 14.42 per cent. Important in this connection is the amount of new construction work projected in Greater New York, all borroughs, excepting the Bronx, showing appreciable gains as compared with last year. In Manhattan, for example, plans for twenty-nine tenement houses were filed estimated to cost $3,273,000, against sixteen in May last year costing $2,106,000; three hotels costing $11,012,000, as against none last year; five office buildings costing $1,750,000, as against none last year, and five store and loft buildings costing $356,000, as against three last year costing $710,000. The total for Manhattan of all construction work for which permits were taken out in this borough was $18,346,772, as against $14,378,327 in May, 1915.

An examination of the accompanying table will show appreciable gains to have occurred in Philadelphia, Pittsburgh, New Bedford, New Britain, Springfield, Albany, Hartford, Holyoke, Utica and Worcester. Many of the increases are due in part to the extensions which are being made to industrial plants and also to the erection of dwellings to provide housing accommodations for the workmen and their families.

CITIES OF EASTERN STATES

	May, 1916	May, 1915
Albany	$924,445	$406.580
Allentown	452,640	189,600
Altoona	111,740	74,712
Belleville, N. J.	20,190	50,078
Binghamton	134,235	95,455
Bayonne, N. J.	232,955	219,288
Boston	5,969,000	8,158,000
Bridgeport	562,468	1,119,354
Brockton	137,271	169,911
Buffalo	1,155,000	1,222,000
Easton	39,400	58,196
East Orange	137,486	82,353
Elizabeth	203,658	99,264
Erie	214,800	179,760
Harrisburg	142,845	326,051
Hartford	1,152,488	691,600
Haverhill	154,100	79,800
Hoboken	24,640	70,980
Holyoke	304,945	55,575
Jersey City	605,327	637,998
Lawrence	69,250	87,465
Manchester, N. H.	166,623	135,747
Montclair	310,000	259,288
Newark	843,958	981,745
New Bedford	1,209,900	271,300
New Britain	1,169,967	111,715
New Haven	489,320	318,740
New York:		
Manhattan	18,346,772	14,378,327
Bronx	2,349,070	4,730,333
Brooklyn	5,140,611	3,650,156
Queens	2,766,358	2,059,460
Richmond	299,675	187,800
Niagara Falls	108,952	79,690
Passaic	234,525	85,175
Paterson	283,009	123,583
Philadelphia	4,791,255	2,868,840
Pittsburgh	1,120,675	937,449
Portland	143,955	203,100
Quincy	217,116	178,590
Reading	206,675	28,775
Rochester	982,216	1,001,455
Scranton	148,837	143,133
Schenectady	129,266	114,825
Springfield	1,158,215	932,818
Syracuse	339,361	257,261
Trenton	97,031	231,344
Troy	81,064	35,002
Utica	258,590	158,705
Washington	1,304,363	992,607
Wilkes-Barre	173,741	149,644
Williamsport	18,130	31,675
Worcester	871,102	356,860

From the middle section of the country come reports from thirty-nine cities, of which twenty-four show increases and fifteen decreases, with a resultant gain of 37.23 per cent. In the list reporting Chicago stands pre-eminent with an increase in the amount of construction projected of over 70 per cent. Reference to the figures for the month of May will be found more in detail in another column. Other cities showing important increases are Detroit, Duluth, Fort Wayne, Indianapolis, Kansas City, Minneapolis, Toledo and Youngstown. The heavy falling off in the operations in Cleveland, as compared with a year ago, is due in part to the increased cost of construction, but the difference in figures is due more particularly to the fact that in May, 1915, a permit was issued for a hotel to cost $1,000,000, and for a large number of apartment houses involving an estimated outlay of $2,500,000.

CITIES IN MIDDLE STATES

	May, 1916	May, 1915
Akron	$921,527	$348,538
Cedar Rapids	170,000	181,000
Canton	396,850	216,575
Chicago	13,707,100	7,902,000
Cincinnati	1,043,345	1,102,425
Cleveland	2,688,080	5,151,909
Columbus	1,030,650	911,785
Davenport	86,418	63,000
Dayton	473,221	313,652
Des Moines	221,030	280,880
Detroit	5,150,845	2,296,990
Duluth	7,272,845	294,148
East St. Louis	97,155	45,183
Evansville	127,175	143,592
Ft. Wayne	698,225	157,875
Grand Rapids	253,970	379,996
Indianapolis	860,030	593,938
Kansas City, Mo.	1,214,900	886,215
Kansas City, Kan.	57,866	64,575
Lincoln	278,310	288,185
Milwaukee	1,017,718	1,186,642
Minneapolis	3,055,800	1,755,860
Omaha	961,240	889,385
Peoria	186,050	231,280
Quincy	217,116	178,590
Saginaw	49,435	52,753
St. Joseph	63,945	155,840
St. Louis	988,540	937,676
St. Paul	1,360,322	1,309,656
Sioux City	173,460	312,950
South Bend	187,260	93,590
Springfield	207,760	86,323
Superior, Wis.	54,749	144,865
Terra Haute	157,509	53,120
Toledo	1,275,117	553,155
Topeka	223,815	42,935
Wichita, Kan.	307,625	36,150
Youngstown	559,200	244,055
Zanesville	24,182	32,871

Coming now to the Southern tier of States, we have twenty-nine cities reporting, of which only seven show decreases, the resultant gain being 36.7 per cent. Important changes on the constructive side are found in the figures for Baltimore, Chattanooga, Dallas, Houston, Macon, Nashville, New Orleans, Richmond, Tampa, Tulsa, Washington and Wilmington.

CITIES IN SOUTHERN STATES

	May, 1916	May, 1915
Atlanta	$385,585	$337,934
Baltimore	1,639,598	612,557
Beaumont, Tex.	91,551	50,566
Birmingham	120,998	192,735
Charlotte, N. C.	33,150	87,470
Chattanooga	448,256	44,295
Charleston, W. Va.	60,163	40,125
Dallas, Tex.	337,488	278,335
Ft. Worth	146,132	57,050
El Paso	231,421	446,407
Houston	265,089	127,305
Jacksonville, Fla.	213,307	282,794
Louisville	333,250	328,090
Macon	537,743	64,900
Memphis	279,535	228,490
Montgomery	49,740	59,472
Muskogee	17,950	2,700
Nashville	466,312	128,257
New Orleans	420,190	297,681
Norfolk, Va.	118,225	155,578
Oklahoma	172,140	41,935
Richmond	471,471	396,300
Savannah	111,465	115,580
San Antonio	164,318	137,840
Tampa	282,505	182,750
Tulsa	505,033	261,825
Washington	1,304,363	992,607
Wilmington	433,936	151,807
Winston Salem, N. C.	70,647	43,500

In the extreme Western section of the country, embracing the territory west of Denver, reports from seventeen cities show a gain of practically 22 per cent. There are only three of the seventeen cities reporting which show decreases, these being Berkley, San José and Stockton. The others indicate gratifying increases as compared with last year at this season.

CITIES IN EXTREME WESTERN STATES

	May, 1916	May, 1915
Berkeley, Cal.	$154,100	$331,650
Colorado Springs	37,269	22,865
Denver	443,400	434,270
Los Angeles	1,379,691	1,168,983
No. Yakima	59,945	12,688
Oakland	414,407	350,035
Pasadena	154,851	115,372
Portland	478,885	432,065
Pueblo	33,624	32,310
San Diego	310,302	80,737
Salt Lake City	396,754	279,791
San Francisco	1,629,527	947,115
San José	30,309	53,434
Seattle	504,365	353,820
Spokane	139,305	130,470
Stockton	81,220	149,185
Tacoma	88,815	49,998

Hydrated Lime for Stucco and Plaster Work

Hydrated lime is often added to the mortar for stucco and plaster work. In using hydrated lime for stucco work the Portland Cement Association suggests the following rules:

1. Mix with 10 parts of Portland cement, 1 part hydrated lime, dry-measured by volume.
2. Add dry, clean sand in proportions 1 part of cement lime mixture to 2 parts sand.
3. Turn until mixture is of uniform color.
4. Add necessary water to make stiff plaster.
5. For first coat on wire or lath add 1 lb. of good cow hair for each bag of Portland cement.

Hydrated lime in stucco and plaster makes cement mortar work more easily.

Obituaries

W. B. Bennett, a prominent building contractor of Pittsburgh, Pa., died at his home in that city on June 11 at the age of 61. He was born in West Fairfield, Pa., going to Pittsburgh in 1884. Many handsome residences and several public buildings in that locality stand to his credit. He was a member of the Master Builders' Association of Pittsburgh.

Charles H. Beckwith, one of the better-known contractors of western Massachusetts, died June 6 at his home in Pittsfield, Mass., at the age of 56. About twenty years ago he went from Chicopee to Pittsfield and was foreman for some years with Dodge & Devanney, at that time the largest contracting firm in the city. When it dissolved partnership, Mr. Beckwith engaged in business with D. H. Pike under the firm name of Beckwith & Pike, executing many large contracts and building some of the finer residences and public buildings in that part of the State.

Mr. Beckwith was a member of the Master Builders' Association, being instrumental in its organization at the time of the building troubles in Pittsfield several years ago.

Bennett H. Hibbard, the largest building contractor of New Britain, Conn., died at his home in that city on June 6. He was born in Torrington, Conn., in 1854, but passed most of his life in New Britain. As head of the B. H. Hibbard Company he was engaged in the mason business, and erected some of the principal buildings in that city. He was interested in the trap rock quarry business and until lately was also engaged in brick manufacturing.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Artistic Effects in Concrete Construction

There is now rapidly approaching completion in two of the small parks under the jurisdiction of the Chicago South Park Commissioners, two groups of recreation buildings, and in connection with which more artistic effects have been attained in the molded concrete surface of the structures than has probably heretofore been accomplished in this kind of work. The unique feature of the construction is a rough surface in which fluted pilasters and a wide ornamental cornice of classic Doric design has been cast without showing the impression of the forms, thus giving the entire exterior walls a monolithic effect of remarkably pleasing and harmonious appearance. This style of construction was first introduced about ten years ago by the South Park Commissioners in conjunction with B. H. Burnham, a well-known architect of that city, since which time it has been developed by the commissioners until they have been able to produce the remarkably artistic features of the present structure.

The main group of buildings as shown in Fig. 1 is of cruciform shape, the length of which is 310 ft. and the width of the central portion 146½ ft. At the main or band plaza end of the structure is an entrance vestibule 15 x 21 ft., with men's and women's toilets and cloak rooms at the side, and stairways leading to the second floor. The vestibule leads to the women's gymnasium and assembly hall, which is 46 ft. x 79 ft. 10 in. with a stage 23 ft. by 17 ft. equipped with large dressing rooms in the rear at the end next to the center of the building. At the sides of the stage are passageways leading from the assembly hall to the men's and women's lockers located at the center of the group of buildings. On the second floor at the center of the entrance front is a large club room, and at its ends are wide stair halls connecting with the balcony extending around three sides of the assembly hall. At the ends of this balcony on both sides of the hall opposite the stage are small club rooms. The women's gymnasium is 24 ft. high at the sides and 39 ft. at the center, the roof being carried by open construction steel trusses supporting wood purlins and rafters. The entire structure is roofed with green Spanish tile. The lacony is 12 ft. above the main floor, below which the side walls are faced with white enameled brick.

The balcony and main floors are of concrete construction with concrete base and maple floor finish in gymnasiums and double floor maple finish in the balconies.

At the end of the building opposite the women's gymnasium is that for men, the inside dimensions being 46 ft. x 83 ft. 9 in. There are small rooms for apparatus at the sides of the outer ends on both first and second floors. The general design is similar to the women's gymnasium with balcony extending around three sides. In the middle section of the group of buildings are the shower baths and lockers for the men and the women, the showers being arranged in the center of the building and separated by a central wall. Light and ventilation are provided through the medium of a very high ceiling with lantern light and passages adjacent to the showers covered with wire glass ceiling and a wire glass roof.

At the end of the main group of buildings in the rear of the men's gymnasium is a large open-air swimming pool, a power house and a service yard. The pool is surrounded by an ornamental brick and concrete walk with long concrete benches, and is connected with the locker and dressing rooms in the main group of buildings by asphalt walks on both sides. The pool is 130 ft. long, 60 ft. wide and divided into two sections. The shallow end is 60 x 80 ft., and is designed for a water depth of 2 ft. at one end, tapering 4½ ft. at the other. The deep end is designed for a uniform water depth of 8 ft. The walls and entire floor of the pool are faced with white enameled tile.

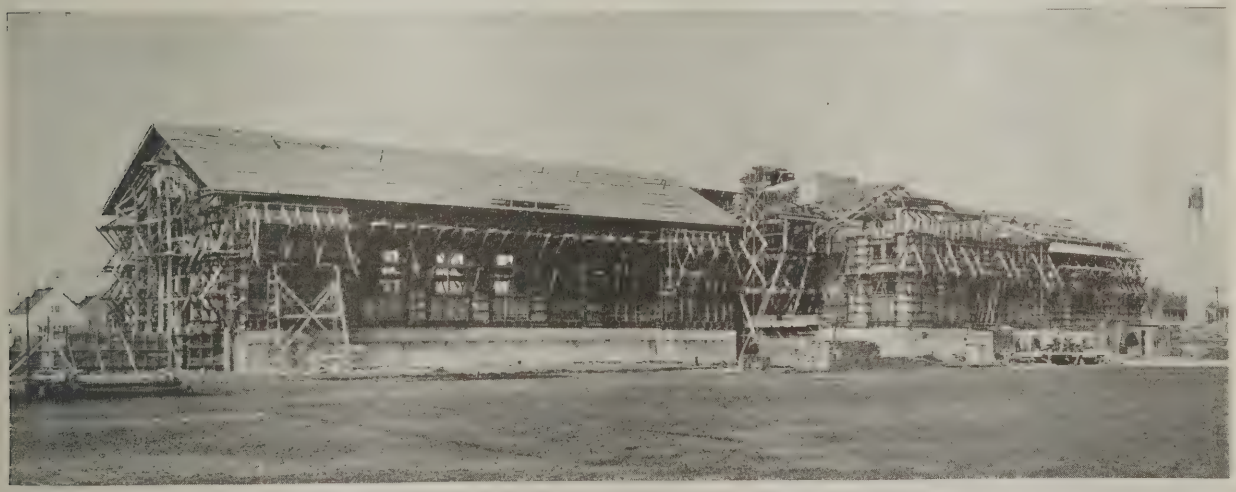


Fig. 1—General View of Group of South Park Recreation Buildings in Chicago in Connection with Which Unusually Artistic Effects in the Molded Concrete Surfaces Have Been Attained

The standard thickness of the walls of the buildings, not considering pilasters and cornice, is 18 in., composed of a 4-in. tile center dry mixed with 7 in. of concrete on the outside and 7 in. of wet mixed concrete on the inside. The dry mixed concrete is composed of two parts cement, three parts torpedo sand and nine parts broken stone which will pass through rings ¼ to ½ in. in diameter. The interior side of the wall is composed of regular wet mixed 1:3:6 concrete. The walls were built in 8-in. layers, the tile being placed first, then the

surface concrete and the wet mixed concrete on the inside of the wall last. In placing the surface concrete it was tamped very hard for a width of about 5 in. next to the tile and very little at the front. By using very small stone of nearly uniform size and a dry mix tamped in this manner, it was possible to crowd the concrete forward into the molded design of the forms, thus bringing out every detail of the design and presenting a uniform rough exterior finish. In mixing the concrete for the surface only about one-third the quantity of water was used as for the wet mixed interior part of the wall. It is said that the inspectors of the South Park Commissioners attribute the artistic results obtained in placing concrete in this manner to the uniform small size of the stone, great care in securing evenly mixed concrete of uniform moisture and the skill in tamping, to crowd the concrete forward into the molded designs of the forms. All concrete used in this group of buildings was mixed in a half-yard "Standard" low-charging mixer made by the Standard Scale & Supply Company, Chicago, the mixer being placed at the ground level about the center, close to the side of the main group of buildings and most of the concrete delivered in barrows from this position. The point is made that this mixer is particularly adapted for this class of construction, since it has a large open end, which permits the inspector to watch the concrete during the entire mixing operation and obtaining more uniform concrete with the amount of water varied as required than would otherwise be possible.



Unique Tests of Cabot's Quilt—Fig. 2—Appearance of the Building During Construction Erected by Explorer McMillan in North Greenland

The general contract for the construction work was in the hands of The John J. Brittian Co., 1401 Fort Dearborn Bldg., Chicago, Ill., which makes a specialty of concrete work of this character. The buildings were designed and their erection supervised by the Engineering Department of the South Park Commissioners under the direction of Chief Engineer Lynn White. Assistant Engineer J. D. Barber was in immediate charge of the work on both groups of buildings.

The "Old English" Style of Slate Roofing

Attractive or novel roof effects are always of architectural interest, therefore a folder just off the press entitled "Sheldon's Old English Slate," will cause more than passing attention. The Old English style of slate roofing, as illustrated on the cover of this folder, breaks up the checkerboard effect and relieves the "slick" appearance of ordinary slate roofs. The method consists of using slates decreasing in thickness from eaves to ridge, which give textural effect and perspective; using slates decreasing in size from eaves to ridge, which relieves the monotony of equal rectangles and adds to perspective; using slates of random widths, which breaks up vertical and diagonal line effect. Slate of sizes calculated to meet these requirements is made by the F. C. Sheldon Slate Company, Granville, N. Y., who furnish the material in green and purple slates, some of which fade on exposure to warm brown and buffs, while others retain their original color, and unfading slates of rustic gray, light and dark green, and light and dark mottled purple in any proportions desired. The company states that it will be glad to make suggestions and to furnish blueprints, lay-outs and samples upon request. Suggestions for specifications, lay-outs on residences and public buildings, and details of Sheldon's graduation "A" for a 25-ft. rafter are also given. Names of recent examples of the application of Sheldon's slates are contained in another folder.

Unique Tests of Cabot's Quilt

Probably the most unique tests of an insulating material which have come to the notice of the trade in recent years were those to which Cabot's quilt was subjected in connection with buildings erected by explorer Donald D. McMillan at Etah, North Greenland, and those put up by Captain Scott in connection with his Antarctic expedition. In Fig. 2 is shown a house built by explorer McMillan in North Greenland, the picture clearly indicating the manner in which the quilt was applied to the walls during construction, while in Fig. 3 is presented a picture of the completed house nearly buried in the snow. The house was 34 ft. square, contained eight rooms on the ground floor, and was fitted with ten windows. Cabot's quilt was used as a sheathing all over the outside of the building, and the explorer states, in a letter written to a friend in Boston, that he not only did not suffer from the cold but many times the house was uncomfortably warm. In the case of the shelter huts of the Scott Antarctic expedition the sides of the building were covered with double boarding inside and outside the frames, with a layer of the quilt between each pair of boardings. The roof had a single layer of matched boarding inside, but the outside was covered with sheathing boards driven close together, then a layer of two-ply "Ruberoid," then a layer of quilted seaweed, then a second covering of matched boarding, and finally a layer of linoleum. Upon the return of the survivors of the Scott expedition a letter was received by Samuel Cabot, Boston, Mass., from Commander Edward G. R. Evans stating that the patent quilting proved highly satisfactory and was thoroughly efficient. These tests cannot fail to prove interesting to builders everywhere, demonstrating, as they do, the insulating qualities of the material in question and proving that it is equally effective in keeping out the heat as well as the cold. The maker states that roofs lined with the quilt render the rooms below more comfortable than would otherwise be the case.



Fig. 3—The Building After Completion and Partially Buried in the Snow

(*Continued on page* 78)

"This Is the Winning Hand!"



"It was a lucky day for me when I became the Neponset Man in my burg.

"I am no longer just a carpenter. I'm an honest-to-goodness business man; my standing is growing, my business is growing, and so is my bank account.

"I am not worrying about the future a bit.

"For I am the Neponset Man."

NEPONSET SHINGLES

will put you on Main Street, too.

Send the coupon today; it will bring you booklet, prices, etc., of "the roofing development of the twentieth century"—of the shingles that cost no more when laid than good wood shingles, yet possess the appearance, and many of the advantages, of slate.

BIRD & SON

(Established 1795)

Dept. B, EAST WALPOLE, MASS.

Chicago: 1434 Monadnock Building.
NEW YORK WASHINGTON
Canadian Office and Plant: Hamilton, Ont.

NEPONSET WALL BOARD

For Walls and Ceilings

takes care of the rainy days.

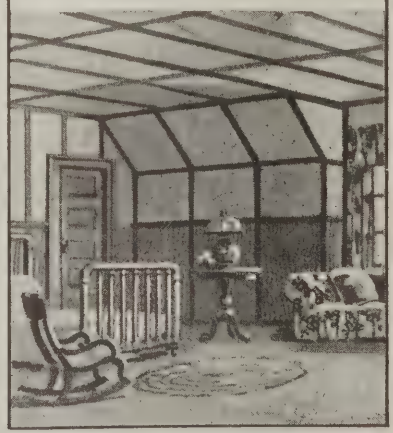
"When bad weather comes around, and rain just pours and pours, you don't find me full of gloom, sitting in the shop praying for 'working weather.'

"No, sir!

"I have a rainy day waiting list.

"Neponset Wall Board jobs keep me under cover in bad weather and odd times, putting up partitions, ceilings, 'phone booths, private offices, etc., etc. People are finding new uses for it every day, both at home and in business.

"When you send the coupon (below) you will get Neponset Wall Board information along with the Neponset Shingles particulars."

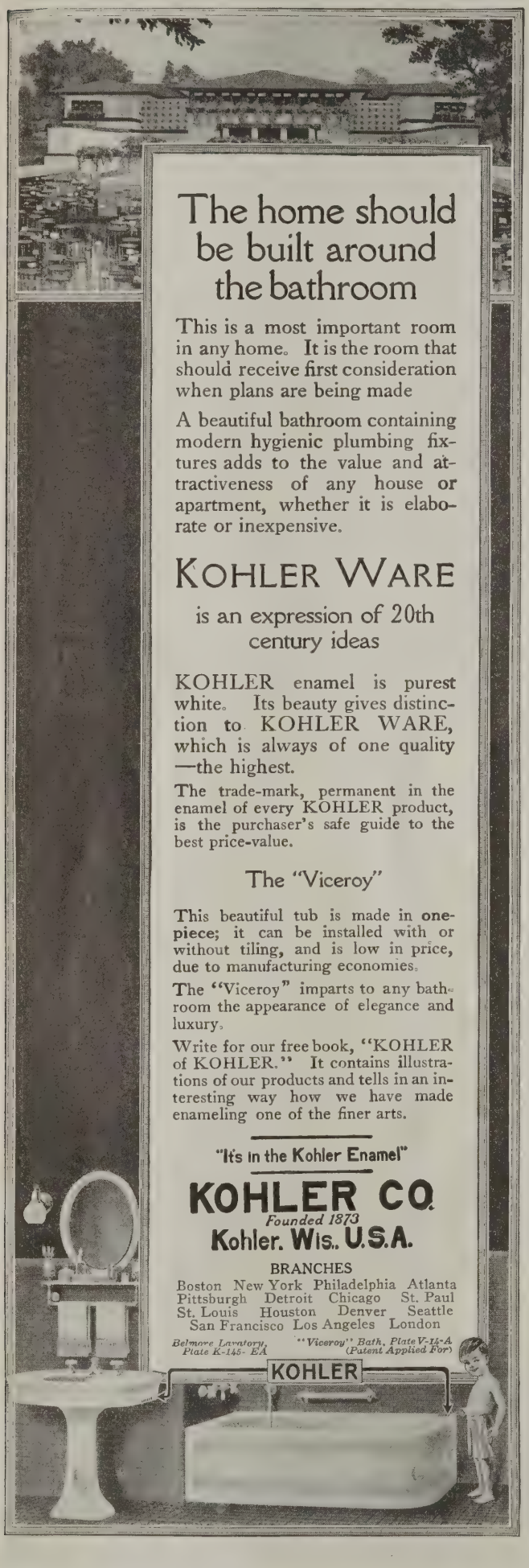


BIRD & SON, Dept. B, East Walpole, Mass.

Please send me information about Neponset Shingles and Neponset Wall Board. Also a copy of your free book, "Repairing and Building." This request, I understand, does not put me under any obligation, whatsoever.

Name .....

Address .....



Coulson Store Front Construction

A new catalog which is being sent out by J. W. Coulson & Company, 107 West Spring Street, Columbus, Ohio, illustrates and describes in detail the Coulson patent store-front construction, which is referred to as being complete in every respect and adaptable to any store front, large or small, expensive or inexpensive. The illustrations are of liberal proportions, so that the various details of construction are clearly indicated. A special feature of the construction is the ventilating system, which allows the circulation of air in the show windows, preventing sweat and frost from forming on the glass, providing the inside inclosures are properly built and allow no warm air to enter from the store room. The ventilating tubes in the sill also act as drainage outlets for any moisture on the inside surface of the glass occasioned by condensation or in washing the windows. At the top of the transom bar are drainage openings to take care of any moisture on the inside surface of the transom glass. Among the many illustrations presented are a number showing display windows constructed in accordance with the Coulson system. Accompanying the catalog is a large blueprint giving details of the Coulson store-front construction.

Stewart Simple Heating Plant

A simple heating plant of the pipeless variety and which is said to work equally well in connection with new or old buildings of every kind, is the "Stewart,"

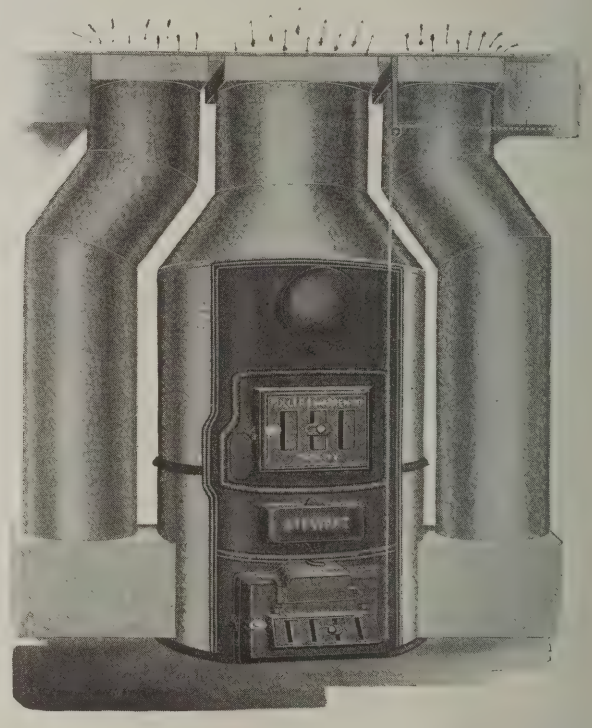


Fig. 4—General View of the Stewart Simple Heating Plant

made by Fuller & Warren, Troy, N. Y. The plant consists of an ordinary furnace provided with one large supply pipe in the center for hot air. The register in the floor is placed directly over the furnace and on either side is a supply or cold air duct, the arrangement being such as to maintain a circulation of air throughout the house, provided, of course, the doors in the various rooms are left open. One particular advantage of this type of furnace, the makers state, is that the cold air may be taken from an exposed place like the hall near the front door, or other equally cold location. Furthermore, if it is desired to run a special pipe to any particularly cold portion of the house, or to a room, as for example the bathroom, it can easily be done. A furnace of this kind is usually placed in the basement as near the center of the house as possible, and the statement is made that the "Stewart" is easy and economical to install. A front view is given in Fig. 4.

(*Contined on page* 80.)

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You are paying higher prices for your materials than you need to Mr. Contractor! Get our **"mill-direct-to-consumer" prices** on your needs. Send **today** for our 156 page illustrated catalog of 5000 Building Bargains! Study it! Save money! You can buy a whole house—or any part of a house—at **wholesale**—from us. Everything for building! We ship to you **anywhere**—no matter where you live! Over **100,000 customers**—some in every State. Over **10,000 contractors, carpenters** and **builders** deal **regularly** with us. All buy by mail. **Three strong banks also vouch for us.** Everything sold under legal-binding guarantee of **safe, prompt delivery, highest quality and satisfaction or money back.** Study these sample prices. Order what you want from this advertisement. Be sure you send for our 5,000 Bargain Catalog. Use the coupon. NOW! **QUICK SHIPMENTS.**

Saved Over $450

Ossian, Iowa.
September 15, 1915.

Gordon-Van Tine Co.,
Davenport, Iowa.

Gentlemen:

Some time ago, one of your representatives called on me in Ossian and asked me how I liked the treatment which your house had given me on my orders and what I thought of your material.

Now I am not very good at writing letters of this sort but I can say frankly that all of the dealings which I have had with Gordon-Van Tine Company have netted me profit and satisfaction. My orders were always shipped promptly and the fine quality of the material enabled me to turn out excellent work, and this last fact alone, has given me considerable prestige in my community. When I recall that I have saved by dealing with you from **$450.00** to **$600.00** dollars, I must say that I am satisfied.

If at any time I can be of help to you as you have been of help to me in interesting my prospective customers, I will be glad to have you call on me. I expect to make the coming year be the biggest in my experience and if your prices are right, which I think they will be, you can rest assured that the bulk of the material which I use will be shipped from your yards.

Trusting that our relations may continue to be of mutual benefit, I beg to remain

Respectfully yours,

(Signed)
R. W. CARTER



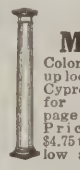
Colonnades

Each pedestal is fitted with adjustable shelves. Can be faced into living room for books, or dining room for chinaware. Craftsman hardware, dull brass or antique copper. Glazed with leaded crystal glass. See pages 86 to 89 in Catalog.
In Yellow Pine - - **$25** In Plain Red Oak **$27**



Built-in Buffets

Wooden bars, bevel plate selected mirror and Colonial butts on the lower doors. Lots of drawer room. Built in two sections for easy installation. Drawers and doors all fitted. Hardware included in price, but not outside casing or trim around openings. Price in Red Oak - **$41**



Porch Materials

Colonial design, built-up lock joint columns. Cypress. Protected for shipping. See page 75 of Catalog. Prices range from $4.75 to as low as - **$1.50**



Screens

Made of soft white pine. Best wire screen cloth. We handle no shoddy screens. All sizes, Door screens, $1.59 up. See pages 55 to 60 in Catalog. Window screens as low as - **53c**



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Plain and fancy windows; all sizes; all prices. Plain rail, glazed 76c up. See Catalog, pages 42 to 52. Check rail windows as low as - - - - **70c**



Thin Oak Flooring

⅜x1½ in., to be laid over old floors or cheap pine boards. Warm, noise-proof. See pages 82-83 in catalog. Per 100 lineal feet, random lengths - **50c**



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All styles and sizes. Quality guaranteed. Hundreds of special designs ready for immediate shipment. See pages 12 to 19 in Catalog. As low as - **$1.07**



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"Quality" Paints backed by our ironclad guarantee. 28 colors. (See page 98 of Catalog for complete chart). In 25 gallon ½ barrels at **$1.10** per gallon; 5 gallon kits, **$1.17** per gallon; 1 gallon cans **$1.22** per can; ½ gallon cans, **65c** per can; 1 quart cans, per can - - - - **35c**



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Quality highest, backed by our ironclad guarantee. Everything! See pages 124 to 142 of Catalog. Front door locks as low as - **$2.50**



Jap-a-Top Roofing

Jap-a-Top Slate Surfaced Shingles. In Red or Green. Permanent and beautiful. Also roll roofings; straight or diamond point edge. See colored insert in Catalog. Diamond Point Roofing per square - - **$3**

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A Garage is usually wanted in a hurry

WHEN the plans are completed you are asked: "How soon can we have it ready to use?"

All material should, when possible be obtainable "from stock". In specifying

Stanley Garage Hardware

you can depend on getting it from the stock of almost any good hardware dealer in the United States: our organization has seen to that.

If he hasn't just what you want, he can obtain it from his jobber, in a day or two.

Then there is this advantage of using "Stanley." Its merits have been made known through advertising, and through satisfied customers, to practically all those who contemplate building. The owner will heartily approve your choice when you select it.

Our book on Stanley Garage Hardware is really interesting, and contains much data of value to you. May we send it to you?

Stanley Works

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Kaustine Sanitary Equipment

Under the above title there has just been issued from the press by the Kaustine Company, Inc., Buffalo, N. Y., a handsome catalog, designated as "E," which illustrates and describes the sanitary equipment manufactured by the company, and which is referred to as affording "practical sewage disposal without water or sewer." Among the early pages is a bird's-eye view of the manufacturing facilities of the company, accompanied by reference to what is designated as "a notable sanitary achievement." Reference is made to a few of the larger uses to which the Kaustine system may be applied, and numerous halftone engravings relate to buildings in which the company's equipment has been installed. The functions and principles of operation of the Kaustine system are set forth in comprehensive style, and the various features are illustrated in a way to command the attention of the architect, the builder and especially the house owner. There are blueprint suggestions for toilet-room additions and various plans for installations. These blueprint pages are bound in with the others and partake of the nature of illustrations. Everything pertaining to the Kaustine system is illustrated and described in a comprehensive manner, and at the end of the catalog is a guarantee which the company furnishes in connection with its equipment.

New Sales Offices of the Kohler Company

That progressive business ability and quality in the manufacture of Enameled Plumbing Ware is a characteristic of the Kohler Company, Kohler, Wis., is indicated by the opening of three additional sales offices at 1010 Chemical Building, St. Louis, Mo., with J. W. Keicher as manager; at 892 Van Nuys Building, Los Angeles, Cal., with Garland Mitchell as manager; and at 703 Mason Building, Houston, Tex., with J. H. Inman as manager.

Protecting and Decorating Concrete, Brick and Stucco Surfaces

Some very interesting information relative to the protection and decoration of concrete, cement, brick and stucco surfaces is contained within the covers of an attractively illustrated pamphlet of twenty-four pages which is being distributed among architects, builders and others interested by Wadsworth, Howland & Co., Inc., Boston, Mass. The primary object of the little work is to present an exposition of the merits of the "Original Bay State Brick and Cement Coating" made from a special white base carried in volatile oils which evaporate upon application. The statement is made that when applied the coating incorporates itself as a part of the material, resisting dampness and thus affording protection to the surface to which it is applied, and waterproofs the walls. The Bay State Coating is made in various colors, and is said to beautify the structure without destroying the distinctive feature of the cement. There are various reasons presented why the builder should use this Bay State Brick and Cement Coating, and the numerous halftone engravings used to illustrate the publication relate to some of the many buildings in connection with which the company's product has been used. These cover a wide range of structures, running all the way from the private residence up to the factory building and grain elevator, and among buildings so treated. Those of our readers who are the concluding pages is a list of some of the many interested in the subject can obtain a copy of the pamphlet upon application to the address given above.

Beamed Ceilings of Sheet Metal

One of the attractive features of interior treatment of modern dwellings at the present day is the beamed ceiling, this being more often found perhaps in the dining room than in other parts of the house, although it is by no means confined to a single room. It is not always that the beams are of wood, because sheet metal is now well adapted to this purpose and numerous very interesting examples of its utilization for this purpose

(*Continued on page 82.*)

THE PERFECT BOND

effected by COMPOSITE METAL LATH is one reason why it is so widely specified and used by prominent architects, contractors and builders.

Composite Metal Lath

is a strong, closely woven, flexible webbing of wire covered with baked brick-clay. It can be used to advantage in place of wire or expanded metal lath wherever these materials are required.

Advantages

It is a well-known fact that plaster or stucco makes a perfect bond with brick. By using **COMPOSITE METAL LATH** this clinch with the plaster or stucco is secured.

Failure due to rust is avoided because the "bricklets" and the plaster form a composite slab. This is firmly fixed to the studs, beams or supports by stapling the "bricklets," which form part of the indestructible slab itself, and are not dependent upon the wire for permanence. The uniform expansion and contraction of such a slab is insured—hence cracks are avoided. By using this material expensive form work is entirely eliminated.

COMPOSITE METAL LATH is economical—there is practically no waste of material as the plaster will not "push through." It requires less plaster and a 3 to 1 mixture can be used to better advantage than 2 to 1.

Free Samples and data covering any special use for which this lath may be desired by you, will be gladly sent upon application

THE COMPOSITE METAL LATH COMPANY

128 Broadway **New York City**

Fiberlic
for Walls and Ceilings

THE principle of wall board construction is right. The question for YOU to determine is, what are the NECESSARY ELEMENTS to produce the best results.

It is not only the fibres, but the way the fibres are prepared that YOU must consider.

The fibres of the ROOT of the tree or plant are the strongest fibres. This is universal knowledge—a scientific fact.

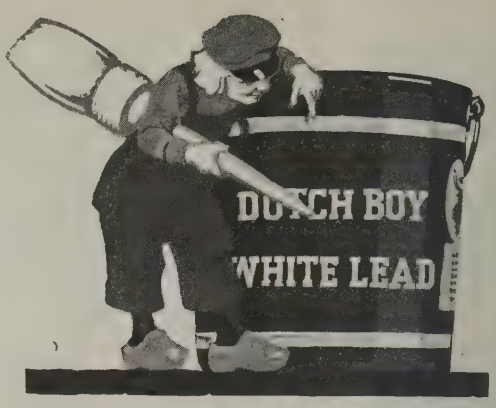
The fibres of ROOT with the starchy and other vegetable matters taken out by a chemical cleaning process are the strongest and purest fibres—another scientific fact.

FIBERLIC WALL BOARD made from a ROOT reduced to pure fibre by a chemical cleaning process constitutes the NECESSARY ELEMENTS.

FIBERLIC averages from 25% to 100% stronger than wall boards made from mechanically prepared fibres that still contain their original vegetable matter.

Write for Fiberlic Wall Board samples and compare them with wall board made from the mechanically prepared fibres and prove for yourself the above facts.

THE FIBERLIC COMPANY
CAMDEN, NEW JERSEY



NEW and distinctive markings have been adopted for the sides of all packages of Dutch Boy white lead. Instant identification of this reliable paint material is now easy.

Each black steel keg has the familiar figure of the Dutch Boy Painter and our guaranty on the side in brilliant orange. In addition, the words DUTCH BOY WHITE LEAD, in large legible type, appear between two bright orange stripes as shown in the illustration.

NATIONAL LEAD COMPANY
New York Boston Buffalo Chicago
Cincinnati Cleveland St. Louis San Francisco
Philadelphia (John T. Lewis & Bros. Co.)
Pittsburgh (National Lead & Oil Co.)

might be cited, one being presented in Fig. 5 of the illustrations, which shows the appearance of such a beamed ceiling in the living room of a residence in New Brunswick, N. J. The house was built about six years ago, the plaster had broken down and it



Fig. 5—Showing Beam Ceiling of Sheet Metal in Living Room of a Residence

was decided to put in a metal ceiling as shown. This was found so satisfactory that the owner decided to install metal ceilings in the entrance hall and in the parlor. In constructing a sheet metal ceiling of this nature the side and end edges are hidden in grooves of the adjoining pieces so that few joints or nails are visible, the nailing being in the covered flanges. The beamed ceiling here shown was installed by Northrop, Coburn & Dodge, 43 Cherry Street, New York City, and the finish is such as to give a wood effect. We understand this ceiling is made only to order and that it can be put up directly to wood or flat tile arches or to old plaster ceilings. Furring strips may be used if desired, but they are absolutely necessary only around the wall line. The steel ceiling is in itself fire-retarding and if an asbestos lining is used above it, protection is afforded to any wood construction that is above.

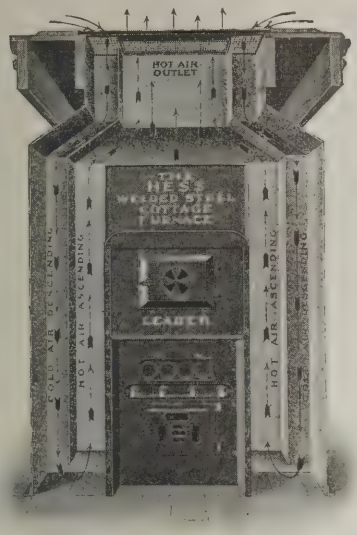
Yaeger Concrete Mixers

Within the covers of an attractively printed catalog of thirty-six pages, profusely illustrated with well-executed halftone engravings, are set forth the merits of the leading lines of concrete mixers made by the Yaeger Machine Company, 216 West Rich Street, Columbus, Ohio. The company states that a close study of the field of demand showed that what the trade really wanted was a dependable mixer that would handle an ordinary size batch and at the same time give a reasonable daily output at a saving of time and labor. The result of this investigation is the "Big-an-Litle" mixer, which has proven very popular with building contractors on all kinds of work. The claim is made that it fills all the requirements of the user and is giving great satisfaction. So great was the demand for this type

(*Continued on page* 84.)

Forty Contractors

who have used hundreds of Hess Welded Steel furnaces all over the United States have recently written us letters telling of their experience and satisfaction with *Hess furnaces* and with our system of dealing direct from factory to contractor and consumer.



The HESS Welded Steel Pipeless Furnace. No horizontal pipes nor air ducts in cellar.

We Have Published These Letters

with several hundred more from other customers, in a small booklet. Without one word from us, this booklet will convince you that *Hess furnaces* are in a class by themselves as a heating proposition.

The contractor and the consumer are safeguarded, not only by guarantees, but by a *trial plan* which holds back the purchase price *until the furnace is tested out to the customer's satisfaction.* The expense is reduced and limited by the *"direct from factory"* purchase, which cuts out middlemen's profit and expenses.

When you need another furnace, secure our estimate and free plan showing how to lay out a furnace system. Write now while you think of it; a postal card will do.

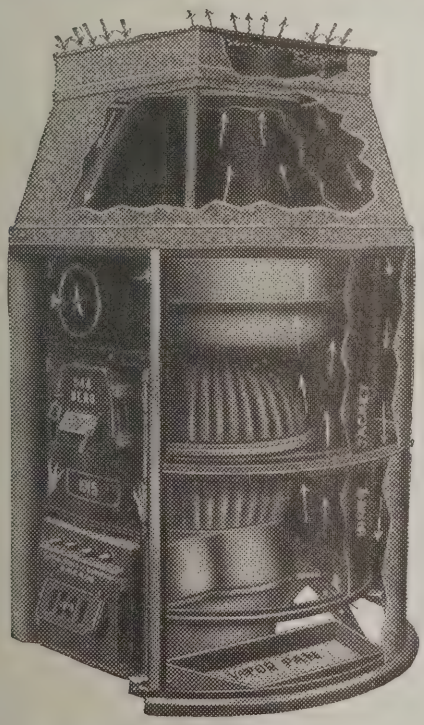


The HESS Welded Steel Furnace for Separate Pipes and Registers.

HESS WARMING & VENTILATING CO., 1201 Tacoma Bldg., Chicago

White Enameled Steel Medicine Cabinets, Also

THE HERO PIPELESS FURNACE



Easy to Install

Also Manufacturers of

The Hero Lines

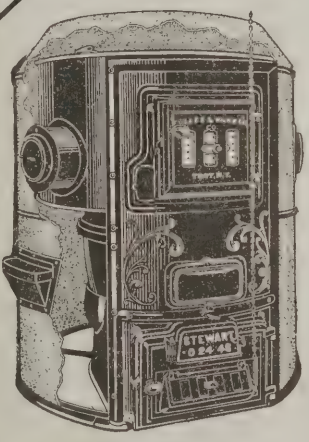
of Basement Furnaces, Hot Water Heaters and School Room Heaters.

Write for Prices and Catalog Also Agency Proposition

CHAS. SMITH COMPANY

57 W. Lake St., Chicago, Ill.

THE STEWART FURNACE



heats with a healthy heat. It sends a constant circulation of warm, fresh air all through the house.



•TRADE MARK•

WHEN you specify a Stewart you provide your client with a furnace that is up to date in the most minute particular. Scientifically designed and honestly constructed, it will give its maximum good service for many years and will eventually pay for itself by reducing fuel cost.

The Stewart is backed by an 84-year cumulative reputation for merit.

Write for booklet, particulars, terms, etc.

Fuller & Warren Co.

Jackson St., Troy, N. Y.

260 Water St., New York City

Since 1832

Tim Trundle's Wheelbarrow Philosophy



"MEN who buy Barrows mostly fergit that a wheelbarrow is more than somethin' fer a man to push.

"They miss the hull point of the thing, which is that a barrow is not only a tool to work with but is the only thing there is by which the man's work is MEASURED.

"One man delivers ten barrow loads an hour and the fellow next to him only eight, from the same pile over the same wheelin' boards, to the same place. The 8-load man is worth only four-fifths as much as the 10-load man.

"And by the same token, a Sterling Barrow will make it easy for a man to do his ten-an-hour stint, while the same man, totin' the same stuff the same distance with common barrows would sweat his shirt and tire his muscles, to deliver eight barrow-loads.

"See what I mean by a barrow bein' a measure of a man's day's work, as well as a tool to work with? A certain number of tons or yards or thousands has to be carried a certain distance on every contract—the measure of all that stuff is the wheelbarrow-load.

"By bein' so much better balanced, and by runnin' so easy on its **self-lubricated fiber bushings** the Sterling Barrow invited every man to carry **bigger loads**, carry 'em **faster** and carry more of 'em than he'd do with ordinary barrows.

"This isn't jest theory; it's boiled-down experience from studyin' a thousand jobs.

"Isn't it good sense, then, to invest jest a little more in the cost of Barrows, if they will give you so many more **ten-miles** on every job?

"Why, man, the increased work done the first week will, like-as-not, pay twice the difference in cost between a **Sterling** and a bum barrow. And after that, the bigger workin'-ability of the Sterling is all 'velvet' on a dozen or a hundred other jobs.

"Next time you buy Barrows DON'T think of them as only two sticks, two legs, a tray and a wheel."

—Tim Trundle

Send for Catalog No. 19

Sterling Wheelbarrow Co.

6201 Shenners Ave., West Allis, Wis.

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges. Foundry and Contractors Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

that the company decided to reproduce the "Big-an-Litle" in a larger size, known as the Yaeger Big Mixer. The catalog under review illustrates and describes the latest models of these mixers, and a copy of it will be sent to any interested reader of this paper who may make application for it.

The Indestructible Roof

Under the above title there has just been issued from the press a very attractive publication of 72 pages, profusely illustrated with line and halftone engravings relating to the reinforced cement tile made by the Federal Cement Tile Company, 905-907 Fort Dearborn Building, Chicago, Ill. This tile, it is pointed out, is not a novelty but the result of many years of practical experience in the field of tile manufacture, and the catalog under review is devoted to the presentation of the necessary details required to aid those interested in roof construction. The claim is made that this tile "has for its important component part the highest grade of Portland cement utilized in conjunction with other ingredients, producing through chemical reaction a material that is impervious to the severest elements." It is stated that "it is not affected by heat, cold, fire or water; that time only strengthens it, and noxious gases only tend to harden it." One of the most important improvements over the former method of manufacture is the system of reinforcement. The metal is so imbedded in the tile as to be thoroughly concealed. A tile covers an exposed surface 4 ft. long by 2 ft. wide and is ⅞ in. thick. It requires 12½ tiles to cover a square, that is 100 sq. ft., laid on a purlin spacing of 48 in. The parts interlock and are self-adjusting, thus providing in every way for expansion, contraction and vibration. The color is said to be a permanent red and no painting is required. The halftone illustrations relate to buildings in connection with which the company's product has been used.

Millers Falls Handbook for Mechanics

A handbook for mechanics, which contains a great deal of information that every mechanic needs, whether he be a carpenter, a metal worker or machinist, and which has been compiled and edited by Edward R. Markham, an instructor in machine-shop practice in the Rindge Technical School, Cambridge, Mass., has just been issued by the Millers Falls Company, 105 River Street, Millers Falls, Mass. The book is of handy size to fit the pocket, being 4½ x 7 in., and has sixty-four pages. It contains valuable tables and is illustrated with diagrams wherever such are necessary. It treats with such subjects as "How to figure board measure, shingles, paint, stone work and brick work; the weight per foot of wood; wood-staining recipes; putty, cement and glue recipes; the number of nails to a pound; the weight of roofings; the weight and volume of fuels; information on grinding wheels; the coloring of steel and brass; the strength of chains; the weight of round and square iron and steel; the composition of alloys; the tensile strength of boilers; how to figure boiler pressure; how to figure horsepower," and more than fifty other subjects. Lengthy technical descriptions have been purposely omitted from the book, which has been written in language that can be easily understood and contains nothing but solid worth-while facts that can be used in every-day work. Because of the cost of this book, it is not offered for general distribution. A plan, however, has been worked out whereby the dealer can give his customers an opportunity to secure a copy of it. A quantity of folders is provided to the dealer to which is attached a postcard that can be torn off and mailed to the Millers Falls Company, which will forward the "Millers Falls Handbook for Mechanics" with the dealer's name and address printed on the front cover.

The Carter Paint Calculator

Under the above title there has just been issued from the press the fourth edition of a little work of interest to painters and builders. It is of a size convenient to carry in the vest pocket, and within its covers direc-

(*Continued on page* 86.)



Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as he expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

Occupation.....

City.....State.....



Full Speed Ahead On Those Construction Jobs

With the FEDERAL Doing Your Hauling

Materials and tools get to the distant jobs about as easily and quickly as to those nearer headquarters—for distance makes little difference to the Federal.

It will enable you to branch out and do distant jobs easily and profitably.

One builder hauls an enormous quantity of material by combining quick loading with the speed of the Federal on the road. He provides his two Federals with extra bodies and can transfer a loaded body containing mill products, sash, doors, etc., onto his Federal in less than ten minutes, including the time taken to remove the empty one. He wastes no time in loading. He wastes no time on the road. He hauls big quantities and reaps big returns. And he uses the Federal to do it.

Write us for practical reports showing costs and results of Federals in the building business. Our magazine "Traffic News," illustrating some of the most interesting true stories of Haulage will be sent free upon request.

FEDERAL MOTOR TRUCK COMPANY, Detroit, Mich.

1½, 2 and 3½ ton Worm Drive Motor Trucks

Here is unquestionable evidence that

JACKSON AUTO TRAILERS

Double pleasure car efficiency

Hillsboro, N. H., April 29, 1916.

Miles Manufacturing Co.,
Jackson, Mich.

Gentlemen:
I have had one of your "JACKSON" Trailers for some time and I find it doubles the earning capacity of my cars. It is the best investment I ever made, and I wish you would enter my order for another Model 24, and ship soon as possible.

Yours very truly,
E. W. PROCTOR.

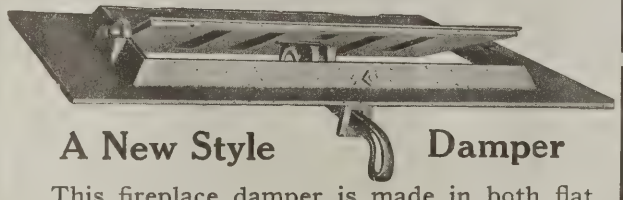


The best material obtainable enables us to build a light trailer which is guaranteed for a load up to ¾ ton at automobile speed.

May be attached to any car.

The Miles Manufacturing Co.
304 Franklin St., Jackson, Mich.

FIREPLACE
MATERIAL



A New Style Damper

This fireplace damper is made in both flat and dome styles. The lever sets under the first row of brick, unexposed, but very accessible and easily operated.

Also made with lower lever so a steel angle can be placed under edge of damper. We make several other style dampers.

Catalog 1590 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

Stover Mfg. & Eng. Co.
747 East Street
Freeport, Ill.

SEND COUPON TODAY

Stover Mfg. & Eng. Co., 747 East St., Freeport, Ill.
Send the undersigned information regarding your
Name .....
Business .....
Address .....

tions are given for estimating the quantity of paint required, as well as the kind of paint to use for a given purpose; how much paint for a certain building and how much lead and oil and colors are needed to make the paint. It also tells what to do when a job is going wrong, how to estimate quickly the gallon costs as well as much other information along this line. Several pages are given up to harmonious color combinations arranged for ready reference. There are also suggestions for painting cypress, pitch pine and other woods containing a considerable amount of gum or sap. The "Calculator" is published by the Carter White Lead Co., Chicago, Ill., and the price is given as 25 cents.

The "Hero" Pipeless Furnace

Many logical arguments are advanced by the Charles Smith Co., 57 West Lake Street, Chicago, Ill., on behalf of the features of the "Hero" pipeless furnace, attention being called to the fact that the equipment will supply a generous volume of fresh, warm air to the occupants of a cottage or bungalow at less cost for installation than the usual furnace outfit and at the same time will provide all the advantages enjoyed by more pretentious homes. The pipeless furnace is referred to

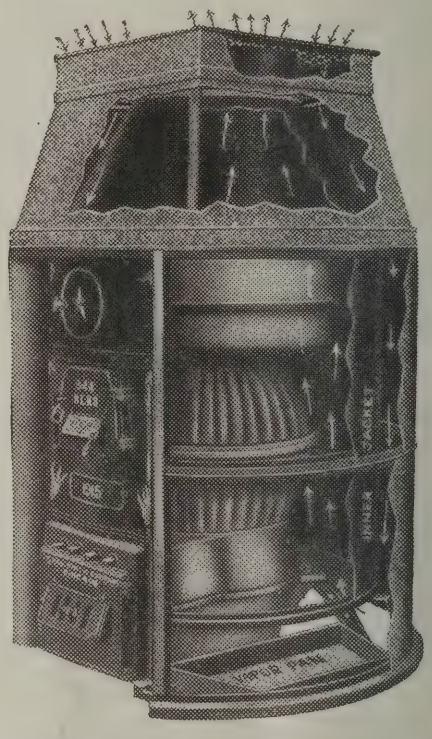


Fig. 6—The "Hero" Pipeless Furnace

as being superior to a stove and requires less time to set than the installation that involves a series of warm air pipes running to the various registers. The furnace is set directly under a large register face which is placed as near the center of the building as possible. This register is divided into a central heat outlet and an outer circulation return air inlet. The circulation is rapid and complete, reaching all parts of the house which communicate with the room in which the register is installed. The chill of upper quarters is taken off by means of floor register openings made through the ceilings of the heated rooms below. The "Hero" pipeless furnace is made with the fewest possible parts and joints, and the latter are made very secure so that the warm air distributed to all parts of the home may be pure and uncontaminated with gases and smoke. The equipment has a solid, one-piece base and a large ashpit that insures ample draft and perfect combustion. The firepot is deeply corrugated inside and outside alike. This greatly increases its strength and practically doubles its radiating surface, besides adding many years to its durability as compared with a smooth firepot. The firepot has deep cup joints, and the best asbestos furnace cement is used. The fire dome is corrugated in the same manner as the firepot and its surfaces radiate the

(*Continued on page* 88.)



Can You Stand on One Foot?

Perhaps for a few minutes, but even during this time your balance may be swinging. On two feet you are solid. So it is with "Trouble Saver" Brackets. Notice the two sturdy legs. These brace against each other at the outer end, thus preventing any side motion.

You can erect as many "Trouble Saver" Brackets in five minutes as you can wooden scaffolds in five hours. No nails, no bolts, no nuts—not a screw.

"Trouble Saver" Brackets will prove their worth. We will lend you some for a trial. Write for proposition.

The Steel Scaffolding Company

Evansville **Ind.**

PETE SAYS—

Perhaps some of my fellow-workers would prefer the **Oblong Carborundum Combination Bench Stone** to the round.—The difference is only in the shape.—Like every other Carborundum Stone they cut quick and clean—give your tools that keen, smooth, edge—an edge that stands up. Every Carborundum Stone is uniform throughout—it has no soft spots—won't get slick—and it *will cut.*

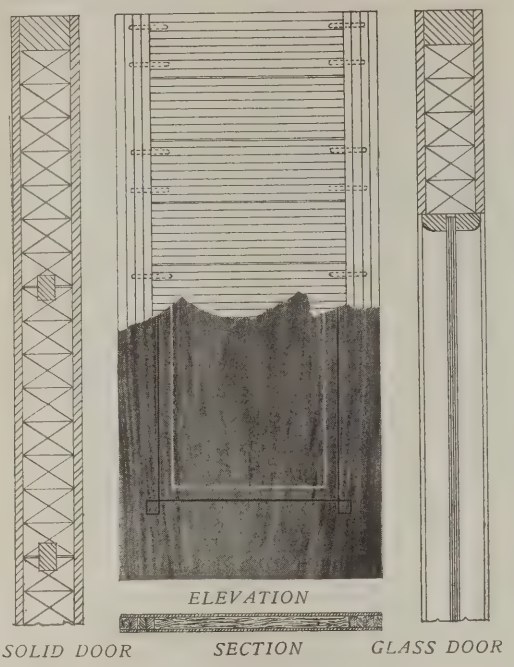
You'll find the combination stones mighty handy—one side is coarse grit, for bringing the tool to an edge—the other side fine and smooth—to give the tool a keen finished edge—really two good stones in one. You can always rely upon Carborundum Stones.—I know, because I use them.—I find them a tool-kit need—a work-bench necessity;

YOUR HARDWARE DEALER HAS THEM

Carborundum Combination Stone No. 108 (oblong), ... $1.25
Carborundum Combination Stone No. 107 (round), ... 1.00



The Carborundum Company
Niagara Falls, N. Y.



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

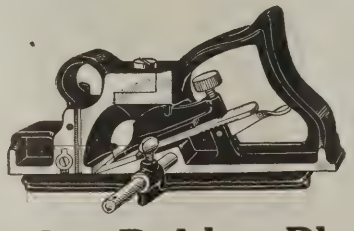
Manufactured by

HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

Stanley Tools



Stanley Rabbet Plane

No. 278

The sides and bottom being square with each other, the plane will lie perfectly flat on either side.

It has an adjustable fence which slides under the bottom, regulating the width of the cut.

It is fitted with two spurs, one on each side, for working across the grain—also an adjustable depth gauge.

As both the fence and the depth gauge can be attached to either side, the plane is suitable for either right or left hand work.

The front part of the plane can be easily detached, thus providing a bull nose plane for working close up into corners or other difficult places. The cutter is one inch wide and is adjustable.

Length over all 6¾ inches; weight 2 lbs.

Price Each $1.75

If you cannot procure same from your hardware dealer, we will be pleased to forward you one, postage prepaid, upon receipt of price

Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

direct heat from the fire. It is made high enough to provide ample room for free combustion and still it catches the direct heat from the fire. In the radiator the products of combustion pass from the center to the lower section of the radiator at the back, then forward on both sides to the front, where they pass to the upper section and back to the smoke outlet. Thus an extremely long fire travel is assured and on account of its peculiar construction all the hot gases are utilized. The "Hero" furnace is made in all the sizes adapted to residence work. The company will be glad to co-operate with contractors and builders to the point of giving the best advice as to the size of equipment that should be used for certain houses and will recommend the best method of installation if a rough sketch of the structure is furnished. Some handsome catalogs, profusely illustrated, have been published, any or all of which may be had on application to the company at the given address.

New Catalog of Starrett Tools

We have received from the L. S. Starrett Company, Athol, Mass., a copy of an attractive publication of 336 pages, illustrating and describing leading lines of mechanics' tools turned out by the company in great profusion. The work is known as "Catalog No. 21," and in compiling it special care has been given to grouping together tools of the same classes and to presenting the facts in regard to the uses of the tools as briefly and as clearly as possible. The catalog is profusely illustrated and contains sixteen more pages than the previous edition, known as "Catalog No. 20." Several of the tools formerly illustrated have been improved in design, and on account of the advance in prices of practically everything used in the manufacture of the tools the company has been compelled to increase many of the prices in the catalog. As the quotations given in Catalog No. 20 are no longer in force, it is essential that the mechanic, in order to note the correct prices, secure a copy of Catalog No. 21. This can be done by direct application to the company at the address given, or from the local hardware dealer. Some of the new tools shown in the new catalog include quick-reading steel rules, drop-forged steel combination squares with metric and English graduations, improved bevel protractors with metric and English graduations, Yankee 1-in. micrometer calipers, hack-saw frames, cutting pliers, pin punches, metric and English folding pocket rules and vernier height gage. There are a number of valuable tables among the closing pages of the catalog and a general and numerical index, all of which will be appreciated by the mechanic into whose hands a copy of the publication may come.

Hints on Slate Roofing

Slate has been in use for a sufficient length of time to have its wearing and fireproof qualities well demonstrated by actual practice, and the familiarity of the trade with the merits of this product therefore render interesting any information in regard to the laying of slate. Material prepared along these lines is to be found in an illustrated booklet entitled "Slate Roofing," now being sent out by the Bangor Slate Mining Co., Bangor, Pa. Within its covers are to be found tables and information concerning the various sizes of slate, their exposure to the weather when laid, the number of pieces to each square, the quantity of nails required, also rules for measuring roofs of slate, either plain, or with hips, valleys, gables, etc., together with plan for laying slate, starting and finishing, the necessary strength of building for slate, pitch of roofs and other information concerning slate which is likely to prove of interest. A copy of the booklet may be obtained without charge by any reader upon request to the company named.

The "Archer Special" Concrete Mixer

The most important requirements for a concrete mixer are that it shall be able to mix a rich, uniform batch of concrete of any proportions and that it be portable and easy to load. The "Archer Special" is

(*Continued on page* 90.)

The largest plant in the world, the most modern equipment, and seventy-six years of specialized experience are behind

DISSTON



SAWS

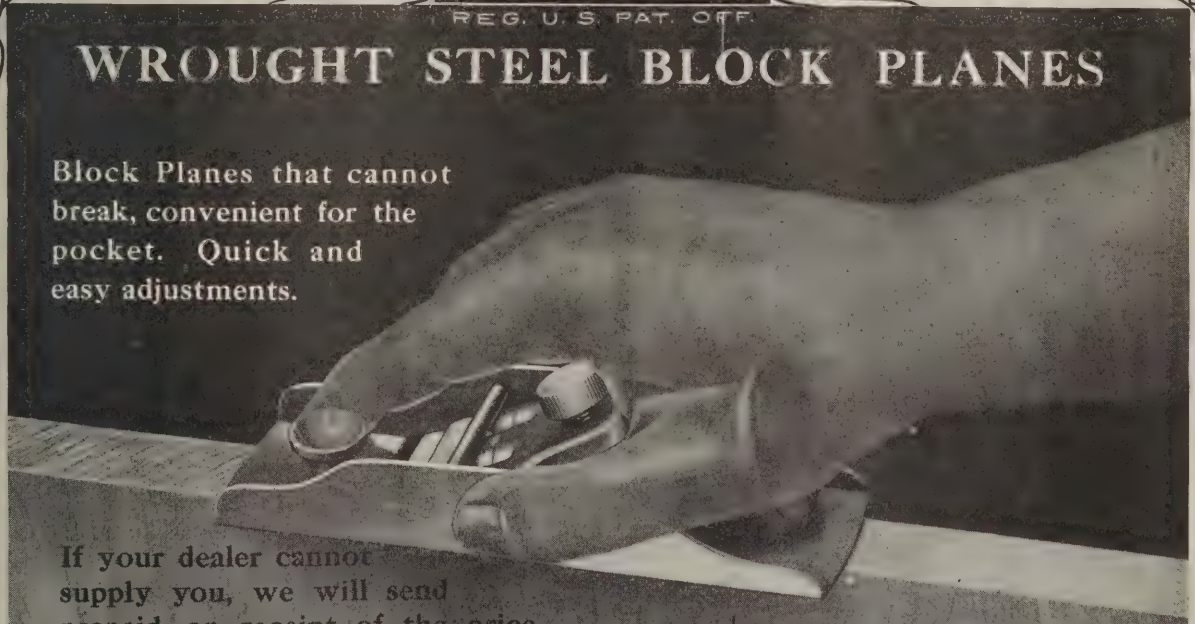
That's why there are probably more of them sold than all other makes combined.
The carpenters know.

HENRY DISSTON & SONS, Inc.
Philadelphia, U. S. A.

SARGENT
REG. U. S. PAT. OFF.

WROUGHT STEEL BLOCK PLANES

Block Planes that cannot break, convenient for the pocket. Quick and easy adjustments.



If your dealer cannot supply you, we will send prepaid, on receipt of the price,

No. 5206—6-inch Nickel Plated Plane, $1.00
No. 4206—6-inch Polished Plane, - 90 cents

For full description of Sargent Warranted Planes, send for the Sargent Plane Booklet.

SARGENT & COMPANY, Makers of Planes squares and Mechanics' Tools
53 Water Street, New Haven, Conn.



Have You Seen Our Plans?

Narrow Mullions

They have met with the unqualified approval of architects and builders. Just the things for sleeping porches, triple windows and bay windows in particular. These plans show how you can effect a saving in construction and secure the maximum glass area.

These plans are free for the asking. Write for them and our catalog.

PULLMAN MFG. CO.
8 Industrial St. Rochester, N. Y.

Manufacturers of
Pullman All Steel Unit Sash Balances

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company

said to have been designed to meet these requirements and to secure portability the mixer is built with most of the weight placed over the wheels so that when the platform is raised about three feet the whole machine balances. To aid in this portability, two legs instead of another set of wheels are placed under the platform end of the machine. These legs are also claimed to help reduce vibration, since when four wheeled mixers are used it is often necessary to put wooden blocks or braces under them in order to take up such vibration. The mixing action is secured by the bucket and blade method. The discharge spout is so arranged that the drum can be quickly emptied. The mixer is loaded through a hopper so arranged as to be just the right height to catch under the front end of the wheelbarrow tray and to be as far away from the unloading crew as possible. A feature of the machine is the end discharge which enables it to discharge into the "forms." Another feature, furnished when desired, is a batch hopper and gate, which provides that while the machine is mixing it can be loaded, the gate keeping the unmixed from the mixing material. When the discharge is over, this gate is lifted and the aggregate goes into the hopper so that no time is lost. The mixer frame has all parts riveted together through heavy gusset plates. Bolts with patented absolute lock nuts are used wherever it is impossible to use rivets. The power is furnished by a 3-hp., battery ignition, hopper cooled gasoline engine with a speed of 450 revolutions per minute and running, it is said, on from 1½ to 2 gal. of gasoline a day. Hoist or steel housing are provided when desired. A booklet entitled "The Archer Special" contains interesting illustrations of these machines in use; also descriptions, partial list of users, etc. It may be obtained from Archer Iron Works, 2440 West Thirty-fourth Place, Chicago, Ill.

A Book About Slate

The slate roof of the Saxon Chapel, Bradford-on-Avon, England, is said to be 1000 years old, but the Bangor Slate Association in its comparison of the annual cost of slate with other materials conservatively estimates the life of a slate roof as being 60 years, the cost per year being 16-2/3 cents. A table showing the cost of the popular roofing materials F. O. B., total cost laid in eastern Ohio, approximate life and cost per year is contained in a little work entitled "A Book about Slate" sent out by the Bangor Slate Association and obtainable from J. Bray & Co., East Bangor, Penn. The pamphlet also contains much other interesting information regarding slate and is illustrated by line cuts.

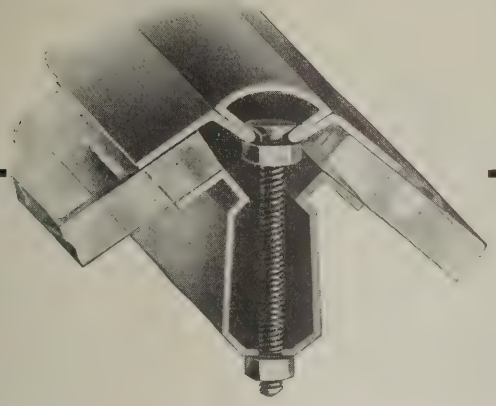
The Bessler Movable Stairway

The Bessler Movable Stairway Company, Akron, Ohio, has just issued an interesting booklet entitled "The Modern Way Up," which tells all about the Bessler Movable Stairway, brief reference to which was made in these columns a short time ago. The stairway is intended to replace stationary stairs leading to upper rooms of a building, and when in use it presents a strong, well-built flight of stairs, but when no longer required it can be made to fold up into the ceiling with nothing visible except a neat panel, finished to match the remaining woodwork in the room. When it is desired to cause the stairway to disappear the stair-horse is rolled up on the panel and when in this position it is swung up into the ceiling by means of a powerful spring barrel concealed under the stairs and by the aid of the counter balance formed by the now projecting stair-horse. When the stairs are wanted for use the panel is pulled down from the ceiling by means of a small chain and the stair-horse rolled down the panel.

TRADE NOTES

The new concrete pier now being erected by the City of Chicago as one of the features of a great harbor plan is said to be probably the largest structure of its kind ever built into fresh water. The concrete used in the construction of the superstructure is being

(*Continued on page* 92.)



No. 182 Corner Bar

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because it is made of heavy, pure copper and will last a lifetime. Its two piece simplicity saves time and labor when installing. It gives an inviting appearance to the store and ventilates the window, which prevents fogging of the glass. It *reduces* the insurance rate and *increases* the window display.

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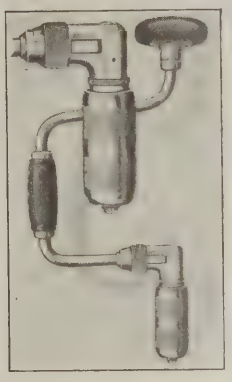
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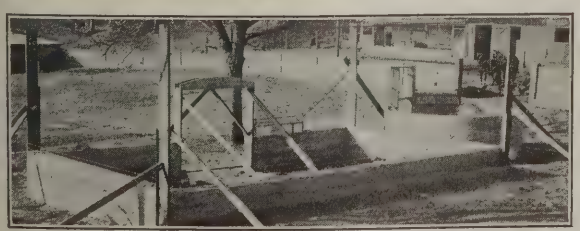
It is the simplest, least expensive and most rapid method in existence. No lumber required save one plumb or corner board at each corner with the necessary braces for same.

Made of metal; supporting frames a rigid truss. All parts interchangeable. Absolutely guaranteed.

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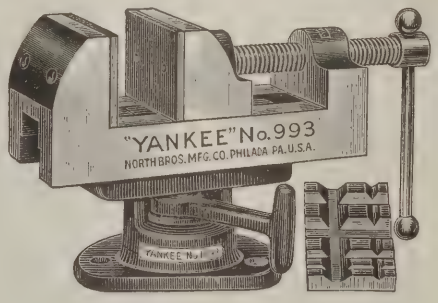
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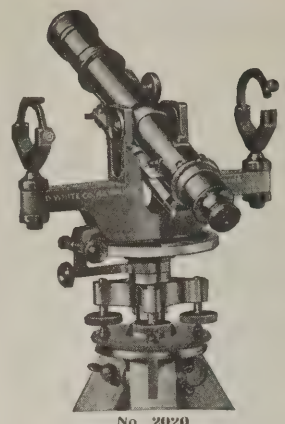
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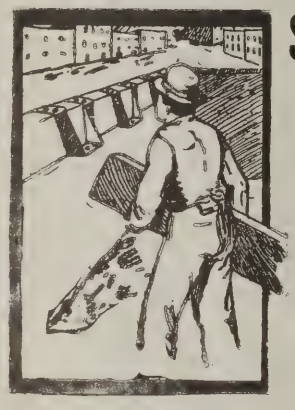


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Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

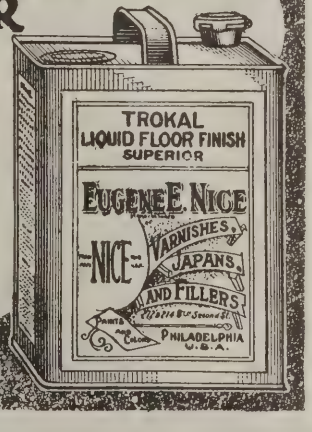
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mixed with 7 Marsh-Capron Rail-Track Mixers built by the Marsh-Capron Mfg. Company, 1415 Lumber Exchange Building, Chicago, Ill. A four page folder containing a halftone engraving of this structure and various pictures of their mixers has just been issued by the company, with brief descriptions thereof. There are also illustrations of the mixers in use and numerous testimonials from users of them.

The L. & I. J. White Company of Buffalo, N. Y., one of the oldest edge tool and machine knife manufacturers in the United States, has very recently changed its management. Walter S. Walls, for the past ten years superintendent of the company, has been elected president and general manager; M. R. R. Thompson, who has been handling the advertising, was elected treasurer, and continues to take care of the advertising. John W. VanAllen, as vice-president, and Frank H. Hamilton, as secretary, were continued in office.

Of interest to the carpenter and the builder who has need of clamps in the making of doors, mitre joints, etc. is a booklet that is being sent out by James L. Taylor Mfg. Co., Poughkeepsie, N. Y. It is entitled "Taylor Clamps" and contains illustrations, descriptions, prices and weights of these clamps together with specifications of certain styles. A partial list of users is also contained, among which are United States Navy Yards, railroads, etc.

Many interesting illustrations of houses in which products of the Sandusky Cement Company, 624 Engineers Building, Cleveland, Ohio, have been used are contained in the May number of the *Medusa Review*. An examination of the numerous photographic views contained therein is apt to afford the ambitious builder or architect an opportunity of enlarging his ideas in relation to houses built of cement, thus enabling him to better please a client who desires that type of dwelling for occupancy.

The builder who uses an automobile in connection with his business will be interested to know that all winners of the races held recently at Sheepshead Bay, N. Y., used Dixon's Graphite Automobile Lubricant made by the Joseph Dixon Crucible Co., Jersey City, N. J. In connection with the products of this company, it is also interesting to note that Dixon's Silica-Graphite Paint was used on the steel work of the $150,000 First National Bank Building, Gastonia, N. C. The pigment used is said to be found only in the Dixon Company's mines at Ticonderoga, being composed of graphite and silica, both of which are of flake formation and have about the same specific gravity. The vehicle used is pure, boiled linseed oil.

Smedley Roofing & Supply Company, Amherst Building, Pueblo, Colo., has just commenced business in builders' supplies in the territory named, and is desirous of receiving catalogs from manufacturers of goods in which they are likely to be interested.

John E. Widlund has just opened an office for the practice of architecture at 1 Cherry Street, Ansonia, Conn., and is desirous of securing samples and catalogs from manufacturers of all kinds of building materials.

At the annual meeting of the Cement Products Exhibition Co., held in Chicago, Ill., the latter part of May, the following officers were elected: B. F. Affleck as president, A. Y. Gowen as vice-president, Blaine S. Smith as secretary and J. U. C. McDaniel as treasurer.

George G. H. Marvin, for 35 years connected with the L. & I. J. White Company, Buffalo, N. Y., maker of edge tools and machine knives, and for 23 years president, treasurer and general manager of that concern, has resigned.

WANTED

Executive, general office man, acquainted with real estate, selling and building, construction, accustomed to meeting and handling high class people. Permanent position, large established business. Give full experience, age and salary wanted. Replies strictly confidential.

Owner, Post Office Box 1248, New York City.



The Building Age

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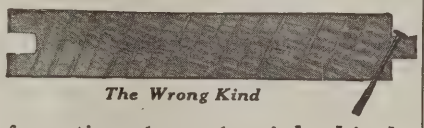
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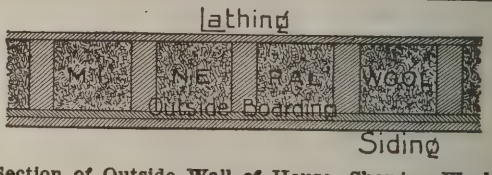
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Section of Outside Wall of House, Showing Wool Between Studding.

Mineral Wool for Building

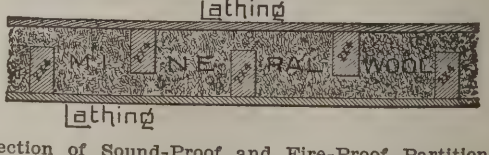
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The Building Age

NEW YORK, AUGUST, 1916

A Shingled House in Needham, Mass.

Special Features of Construction and Arrangement Likely to Interest the Builder—Cost $4200

THE design of the house here illustrated and described was determined by the requirements of the physician for whom it was built, the problem which the architect was called upon to solve involving among other things a relatively small first floor plan, with kitchen so placed as to serve either the living room or the dining room, or both. The owner expressed a preference for cabinets or cupboards in the kitchen, rather than to have a pantry. Another factor was a large second floor plan with four or five bedrooms, bath-

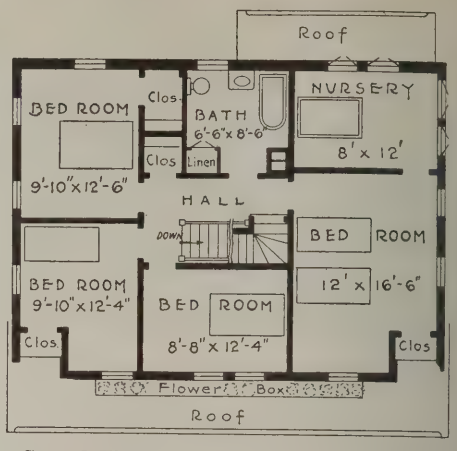


A Front View of the Shingled House—Architect Edgar T. P. Walker, Hingham, Mass.

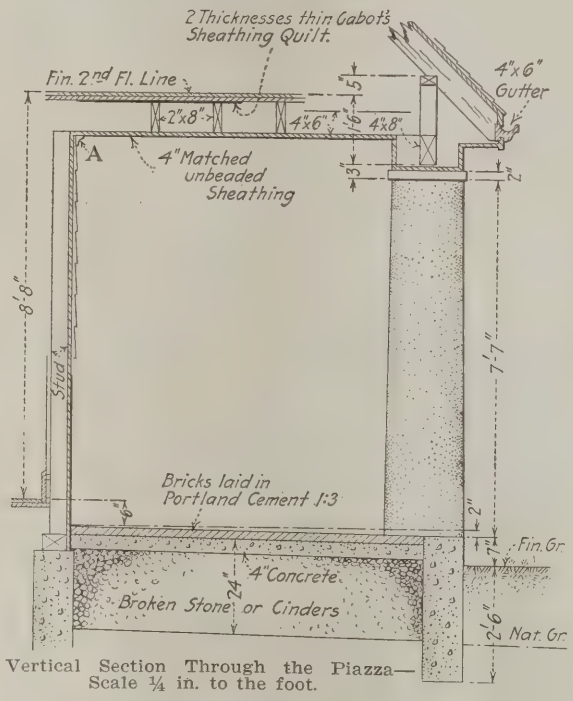
room and ample closet room. In a small house this was a severe problem, and as a consequence the stair hall had to be of minimum size with space



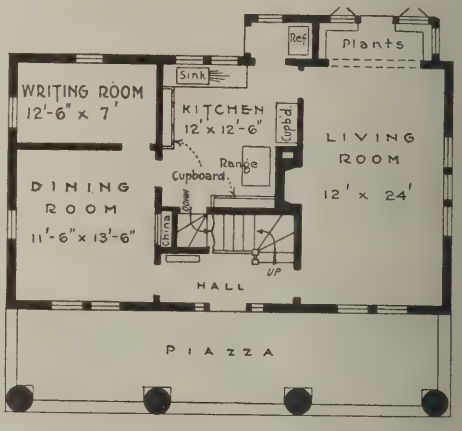
Rear Elevation of the House—Scale 3/32 In. to the Foot



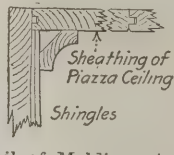
Second Floor Plan—Scale 1/16 In. to the Foot



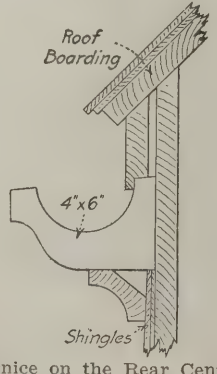
Vertical Section Through the Piazza—Scale ¼ in. to the foot.



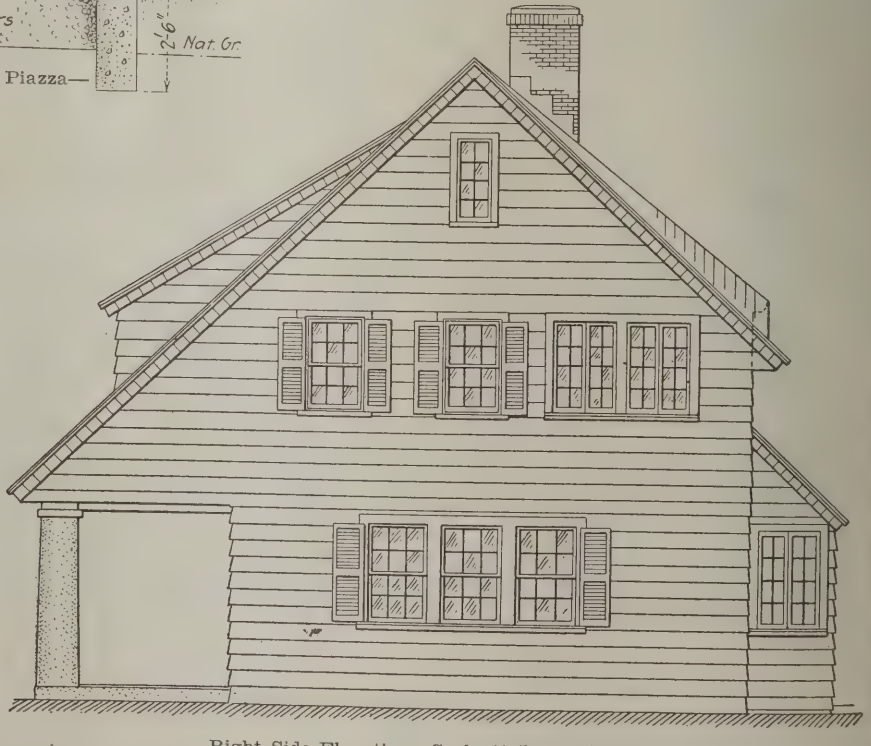
Main Floor Plan—Scale 1/16 In. to the Foot



Detail of Molding at "A" of the Piazza—Scale 1½ in. to the Foot



Cornice on the Rear Central Portion of the House—Scale 1½ in. to the foot.



Right Side Elevation—Scale ⅛ In. to the Foot

Plans, Elevations and Details of a Shingled House at Needham, Mass.

only for a hall stand on the first floor, and on the second floor ready access to each of the several rooms. The manner in which the architect solved this problem is clearly indicated in the floor plans presented on another page, while the many details afford an excellent idea of the method of construction that was pursued. The stair hall is attractively finished on both floors, the style being Old Colonial.

The exterior walls are covered with long Vancouver red shingles, combined with a finish of cypress, all painted white. The shutters and doors are painted a bright green, thus giving a pleasing contrast and making the house attractive in its external appearance.

An examination of the several halftone engravings shows a broad piazza extending across the entire front of the house, and having a brick floor set on a concrete slab resting on top of a bed of cinders surrounded by a concrete wall one foot thick. The large columns of solid concrete covered with white cement slap dashed, and the double windows at the right and left of the main entrance constitute noticeable features. The large windows in question also afford a maximum amount of light to the front rooms, and present an attractive interior aspect owing to the fact that they finish on top of the baseboard.

Referring to the floor plans it will be seen that the living room is a feature of the arrangement, extending as it does practically across the right end of the house, the rear portion terminating in what may be designated as a small conservatory or place for growing plants. At the extreme left side of the house is the dining room, communicating as already stated directly with the kitchen and provided with a china closet. At the end of the dining room and lighted by two windows is the library or writing room. On the second floor are four sleeping rooms, a nursery, and a bathroom. Numerous clothes closets are provided, and opening into the bathroom is the linen closet. In the attic is sufficient space for two additional sleeping rooms, should circumstances require.

The foundation walls are of concrete mixed in the proportion of one part of Portland cement to two parts clean sharp sand and five parts of broken stone. The sills have a 1:1 cement wash, and the cellar, in which is located the laundry, has a floor of concrete 2½-in. thick resting on a bed of gravel.

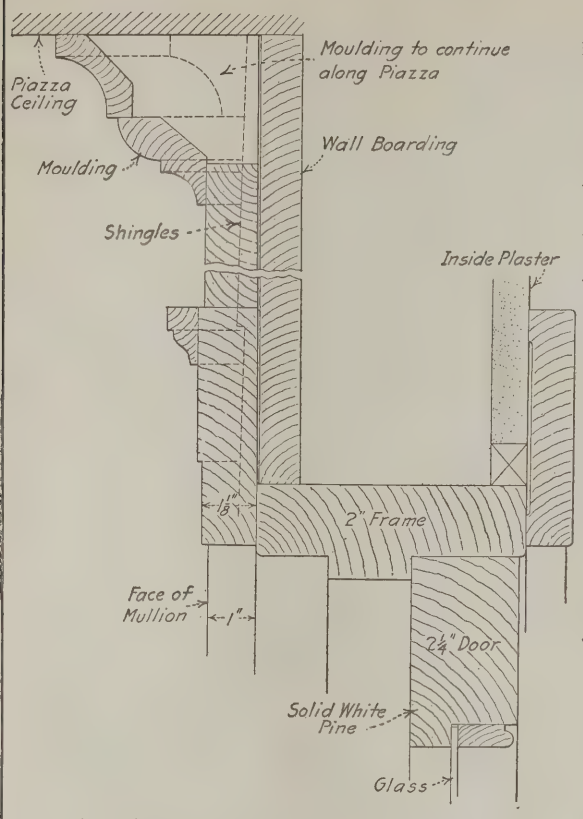
The piazza floor is built of hard-burned water-struck brick, selected for color, and laid in Portland cement, the joints consisting of one part cement and three parts sand. The porch floor rests on a bed 2 ft. deep, consisting of broken stone or cinders.



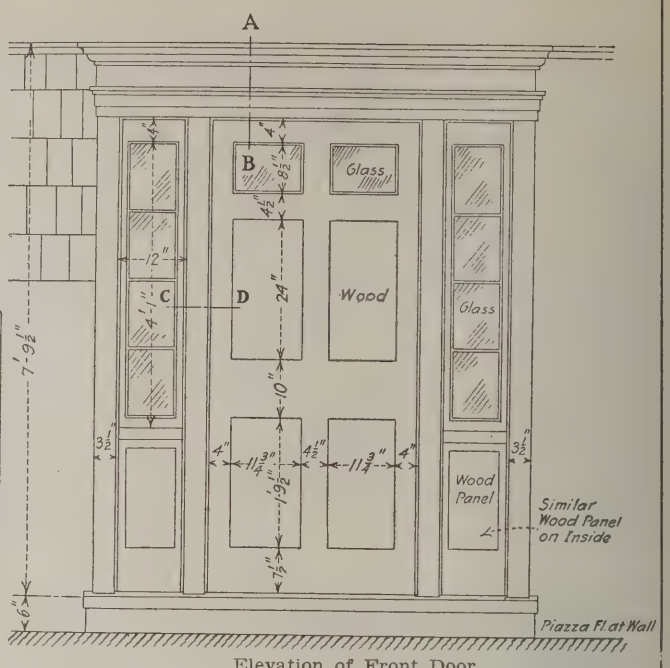
A Shingled House at Needham, Mass.—A Photographic Perspective Showing the Immediate Surroundings

The framing timbers are of spruce, the sills being 6 x 6 in.; the posts, 4 x 6 in.; the studs, 2 x 4 in., placed 16 in. on centers; the girts 4 x 6 in., and the door window studs, 3 x 4 in. The plates consist of two pieces of 2 x 4 in. spruce, the girders, 6 x 8 in. resting on 3½-in. Lally columns with cap and base; the first and second floor joists are 2 x 8 in., and the third floor joists, 2 x 7 in. spruce, placed 16 in. on centers; the piazza floor joists, 2 x 6 in., are also placed 16 in. on centers; the collar beams, 2 x 6 in., placed 20 in. on centers; the rafters, 2 x 8 in., placed 20 in. on centers, and the headers and trimmers, 4 x 8 in.

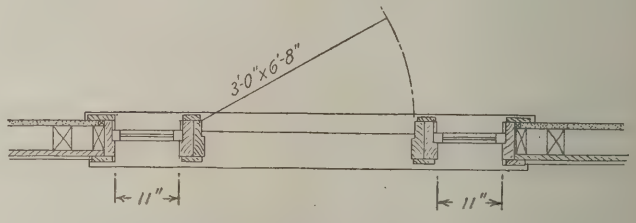
The outside walls and roofs of the house are covered with hemlock sheathing boards, over which on the vertical walls is one thickness of black Neponsett



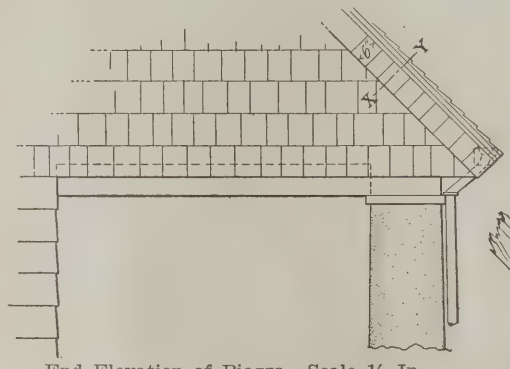
Section of Front Door on Line A-B of the Elevation—Scale 3 In. to the Foot



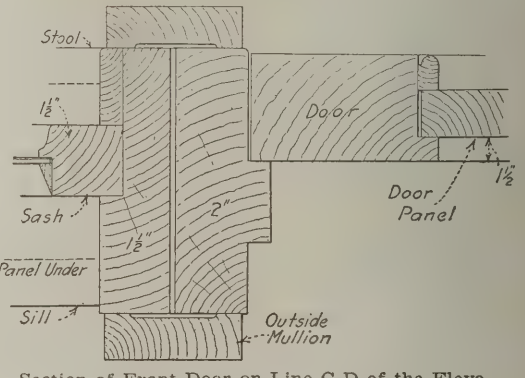
Elevation of Front Door



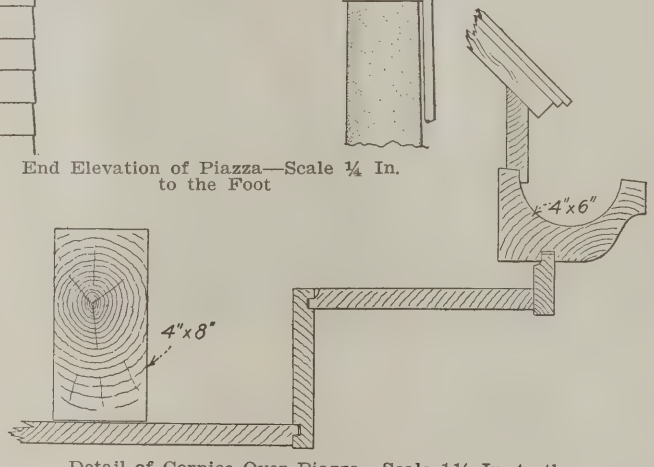
Horizontal Section Through Front Door and Frame—Scale ⅜ In. to the Foot



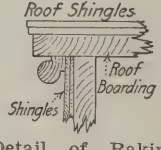
End Elevation of Piazza—Scale ¼ In. to the Foot



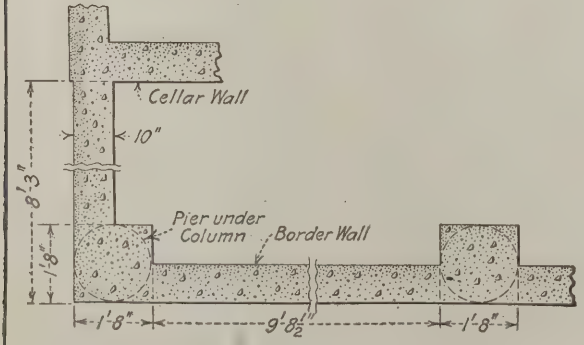
Section of Front Door on Line C-D of the Elevation—Scale 3 In. to the Foot



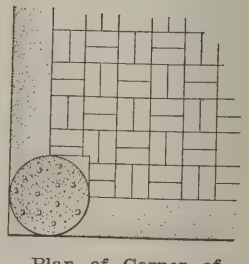
Detail of Cornice Over Piazza—Scale 1½ In. to the Foot



Detail of Raking Cornice on Line X-Y of the End Elevation of the Piazza—Scale 1½ In. to the Foot



Partial Foundation Plan—Scale ¼ in. to the foot.



Plan of Corner of Piazza Showing Brick Floor—Scale ¼ In. to the Foot

Miscellaneous Constructive Details of a Shingled House at Needham, Mass.

building paper with well-lapped joints, this in turn being covered with cypress shingles laid 8 in. to the weather, the shingles on the walls having been dipped before laying. All roof surface was covered with "Extra" cedar shingles laid 4½ in. to the weather, all shingles over 6 in. wide being split before laying. The shingles were thoroughly secured in place with zinc-coated nails made by the Malleable Iron Fitting Company.

The floor timbers are carried to the outside studding and thoroughly nailed, thus making a strong tie across the house. All floors are stiffened every six feet with herringbone cross bridging, and all door and window openings are trussed overhead. The floor joists are doubled under all unsupported partitions running parallel with the joists. The sill was painted underneath before setting it in place.

The floors of the house are double, the sub-floors being of squared edge spruce. Under the portion of the rough floors of the rooms extending over the piazza are two thicknesses of Cabot's Sheathing Quilt.

The finish floors of the living room, dining room and halls are of oak; all other rooms having floors of heart rift Georgia pine.

The outside finish is of cypress, and the main cornice as well as the piazza cornice have stock pattern cypress gutters with all joints covered with lead. The ceiling of the piazza is of 4-in. matched unbeaded North Carolina pine sheathing. The piazza floor is of 3 x ⅞-in. hard pine.

All windows have stock frames of No. 1 white pine with pulley stiles and parting beads of hard pine. The sills are rabbeted and of 2-in. stock. All windows have 4½ architraves. All double hung sashes are provided with Samson spot cord and balance weights. All sash is glazed with German glass single thickness. Casement windows are provided in the conservatory and the museum.

White pine blinds with stationary slats are provided for the windows, as shown in the halftone illustrations.

The plastering consists of two-coat work, the rough coat being of No. 1 Extra Rockland lime, clean sharp sand, and the best quality long cattle hair well beaten and soaked before mixing in the proportion of 1½ bushels of hair to each cask of lime. The skim coat is of Rockland lime, putty and beach sand troweled to a hard smooth surface. The architect states that all lime was thoroughly screened and slacked at least six days before mixing, and that no plaster was used that had not been mixed and stacked for at least three weeks.

All interior doors on the first floor, except the French windows and those from the kitchen to the cellar and kitchen to the rear porch, are what are known as "Korelock," made of birch and of the two-panel variety. All other inside doors, except where French windows are shown, are of the five cross-panel stock pattern fir 1½ in. thick. The door knobs are of glass. The outside front door is of white pine 2¼ in. thick and paneled as shown in the details presented on another page. The French windows are of 2¼-in. birch. The outside door frames are of white pine double rabbeted with 2-in. rabbeted hard pine sills.

The interior finish throughout is of North Carolina pine painted white, the architraves being ⅞ x 4½ in. plain for all jambs, and the headers 1 x 5 in., the head projecting ⅛ in. beyond the jambs. There are no corner blocks but simple plinth blocks at the doors. The architraves in the kitchen



A Shingled House at Needham, Mass.—A Detail of the Piazza and Dormers.

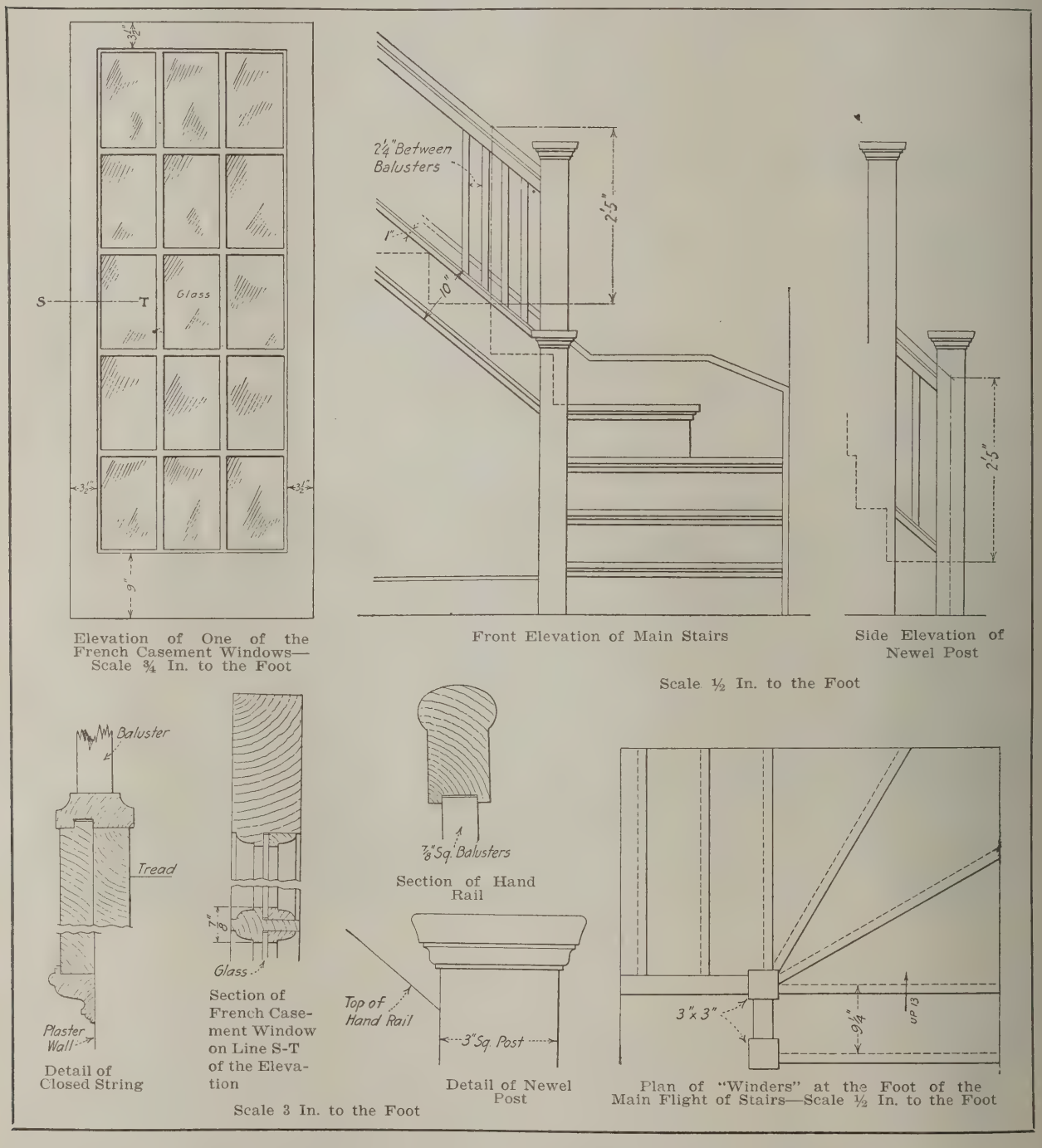
are 4½ x ⅞ in. plain rounded corners with butt joints. All rooms have ⅞ x 6 in. base with no molding. The dining room and living room bases are 7 in. high from the finish floor. These two rooms also have a wood cornice. The dining room has a white wainscot with painted canvas under the chair rail. The house both inside and outside with the exception of the kitchen and entry is painted white.

The fireplace in the living room is of dark red waterstruck brick, laid in cement mortar, the face of the fireplace being of old Dutch tiles.

The bathroom is provided with the usual open type fixtures, with medicine cabinet set between the studs and mirror in the door.

The house here illustrated and described was erected in Needham, Mass., in accordance with plans and specifications prepared by Architect Edgar T. P. Walker, with offices at Hingham, Mass.

Nickerson & Scarr, 10 Pearl Street, Dorchester, Mass., were the contractors and did the carpentry and masonry work, the brick floor for the piazza, the concrete and plaster work, as well as the interior finish, for $3,170, their work making the house complete, except for the heating, plumbing, painting and electric lighting. The owner looked after the installation of the electric lights and directed all the painting. The hot water heating system was installed by John Gegenheimer of Needham, Mass., for $380, and the plumbing with open fixtures for $324.



Elevation of One of the French Casement Windows—Scale ¾ In. to the Foot

Front Elevation of Main Stairs

Side Elevation of Newel Post

Scale ½ In. to the Foot

Detail of Closed String

Section of French Casement Window on Line S-T of the Elevation

Section of Hand Rail

Detail of Newel Post

Plan of "Winders" at the Foot of the Main Flight of Stairs—Scale ½ In. to the Foot

Scale 3 In. to the Foot

Miscellaneous Constructive Details of a Shingled House at Needham, Mass.

Pacific Coast Building Operations

Our San Francisco correspondent, writing under date of July 1, in regard to the building situation on the Pacific coast, says:

Longshoremen, deckhands, and other workmen employed in handling cargo on the coastwise and

river steamers along the Pacific coast went on strike several weeks ago, with the result that the building business in the Pacific States, and in the San Francisco district especially, is very badly handicapped. The effect is seen in the official records for the week ending June 24, when the valuation of building contracts filed with the County Recorder fell lower than for any other week since 1906, and very few new permits were issued during the latter part of the month.

The reason is that most of the lumber used in San Francisco is brought in by steamer from the Columbia River, Puget Sound, or from the Humboldt redwood district, and the supply has been practically cut off. For some time it was impossible for contractors to get any lumber, lath or shingles at all, as the lumber yards all stood out against the union demands and the yard workmen would handle nothing that was unloaded by strike-breakers. As a result most of the carpenters in the city have been idle, as well as plasterers and others whose work depends on that of the carpenter, and conditions have not been much better at most of the bay towns. At first the strike was expected to end quickly, but it has dragged out for several weeks, with no end in sight yet, and the situation has not been much relieved by the few concerns that have agreed to the union terms.



View Looking the Length of the Piazza

The interior towns have had little trouble, as most of their lumber comes from the Willamette Valley and Sierra Mountain mills by rail.

Work was recently started on the long-projected office building of the Southern Pacific Railroad near the foot of Market Street, San Francisco, when men began driving piles for the foundation. The piles driven are 135 ft. long—said said to be the longest ever used for foundation work in this city—owing to the ground, formerly tide land, having been filled in. The building, of Class A construction, will have a frontage on the south side of Market Street of 275 ft., the full distance between Spear and Stewart Streets. It will be ten stories high, with provision for additional stories, and will cost about $1,250,000. Bliss & Faville are the architects.

A regiment composed of building contractors and mechanics, architects, material dealers, etc., is being organized to take part in the great Preparedness Parade to be held in San Francisco July 22, the work of organization being directed by State Senator W. S. Scott. Enrollments have come in rapidly, and the plan is to form a permanent organization that could be used in case of military necessity.



View in the Living Room of the Shingled House at Needham, Mass., Looking Toward the Open Fire Place Showing Bookcase at the Right and Casement Window at the Extreme Left

The Portland Cement Industry

The first half of 1916 has been a busy period for the Portland cement industry in most parts of the United States. Labor troubles have caused the temporary shutting down of a few plants in Illinois, and the business ordinarily taken care of by these plants has gone to others in the Central States, but none have been reported as having voluntarily closed in 1916.

The opening of a new cement plant nowadays, when the country is so well dotted with plants, is an event of importance, and the fact that two new ones have begun operations is of considerable interest. Both of them are in the Middle West, one at its extreme north, at New Duluth, Minn., the other at its extreme south, at Houston, Tex.

In 1914 and 1915 there was a decrease in the production of cement, consumers exercising strict economy in its use, but the year 1916 shows a reaction, having opened with a demand unprecedented for a midwinter season. Prices, which had averaged only 86 cents a barrel for the entire year 1915, began to rise toward the end of that year and in the Eastern and Middle States, where cement sold at 70 to 90 cents a barrel, they continued to rise in 1916 until, in June, they ranged from $1.10 to $1.25 a barrel. The increased prices, of course, do not mean an equivalent net increase in returns to the manufacturers, for the costs of explosives for blasting and of coal have both risen, and laborers are in many places demanding an increase in wages. These comparatively high prices have not, however, checked the demand for cement. Many manufacturers are selling all they can produce, and others are even drawing on stocks so as to fill orders promptly.

Although no statistics have been reported to the United States Geological Survey at this date, it is believed that the total output of Portland cement for the first half of 1916 has considerably exceeded that for the corresponding period of 1915. In general an optimistic feeling prevails among manufacturers, and it is confidently predicted that the year will show a gain over 1915, both in production and shipments of Portland cement. Moreover, there is a fair possibility that they will exceed those of 1913 and thus establish a new record.

Fillers for Cracks in Floors

Now that the use of rugs on painted or varnished floors has become almost universal, the painter is frequently called upon to fix up an old floor to prepare it for painting or staining. One of the most difficult parts of the problem is that of filling up the wide cracks that have been caused by the shrinkage of the wood, so that the filler will "stay put." Various crack fillers have been put upon the market, and some of them are quite satisfactory and may be used by the painter with the assurance that if directions are carefully followed, the results will be pleasing to his customers, but it is not always possible to obtain these prepared materials at the local dealer's store at the time they are wanted, and the quantity required for a single floor is usually too small to send a special order to the distant manufacturer or jobber. Therefore, says a recent issue of the *Painters Magazine,* we feel that a few recipes for crack fillers that can be prepared by the painter, and which are said to be satisfactory, will be appreciated.

The following method is given by H. B. Brewster, a well-known master painter of Newark, N. J., as one that he has always found to give perfect satisfaction and which will stand hard usage without loosening from the cracks. He takes a cheap varnish and stirs in plaster of paris gradually, until it gets to the consistency of putty. For small cracks he does not make it as stiff as he would for the wider ones. He cautions against putting either turpentine or dryer into the filler—just varnish and plaster, nothing else. The material is worked just like putty and pressed into the cracks in the same manner as putty. It is much slower drying than plaster and may be kept soft for some time if kept in a sealed can. While he says that he uses cheap varnish in making this crack filler, better results would probably be obtained from the employment of a fairly good varnish.

The Floor Should Be Well Cleaned

In using the above, or any other crack filler, it is important first to thoroughly scour the floor and allow it to become perfectly dry, and to clean the cracks entirely free from dirt, otherwise there is likelihood of grease adhering to the sides of the cracks, which may prevent the filler from firmly adhering.

A good linseed oil and whiting putty may be used as a crack filler and this is improved by adding to it some dry white lead. Enough raw sienna or other coloring matter to make it match the floor should be employed where the floor is to be stained and varnished. For painted floors it will not be necessary to color the filler.

The filler must be pressed down firmly into the cracks, smoothed down by wetting the putty knife with turpentine and allowed to dry hard and firm, when the surface should be sandpapered.

Before using any putty mixture in filling cracks it is well to give them a coating of linseed oil. Boiled oil is recommended by some practical men.

For filling cracks wider than a quarter of an inch the following has been recommended:—Use a mixture of glue size, whiting and fine sawdust, with enough coloring matter to tint it to match the floor boards, made into a putty-like mass and applied in the same manner as ordinary putty.

A Good Filler from Blotting Paper

Another method that is said to be good is to soak blotting paper in water until it can be squeezed out and kneaded into a fairly stiff mass with glue size and whiting. This, also, should be colored to match the floor boards. It is claimed that none of these fillers will shrink if pressed down firmly into the cracks and permitted to harden.

Another formula consists of a mixture of whiting and glazier's putty, to which blotting paper soaked in water is added, and the whole mass well kneaded together with some brown japan and a little turpentine well pressed into the joints with an ordinary putty knife.

A Modern Barn for the Dairy Farm

Side Walls of Tile with Gable Ends of Frame Construction and a Self-Supporting Arched Roof

By W. E. Frudden

THE subject of barn construction and arrangement is one of never-ending interest to the builder doing work in the farming sections of the country, and the design which is here presented involves features which are likely to attract more than passing attention. This large, roomy and conveniently arranged dairy barn is located in Pocahontas County, Iowa, this being probably the biggest farming State in the Union.

The structure, strictly speaking, is a dairy barn arranged with factory efficiency. Forty cow stalls, a large calf pen, two feed rooms with grain bins over head and over 100 tons loose hay have been provided for in this 40 x 100 ft. building. The cattle face the center feed alley. There are 20 stalls and stanchions on each side of the barn and the calf pen and the feed rooms are located at the end of the building. The whole barn is light and airy and a spick-and-span condition rules. Not only are the cows given a comfortable home, but the milkers and the men who do the chores are contented. The greatest drawback with the dairy business to-day is the labor problem, but the man whose farm is supplied with a milk-producing factory like that here shown will have this perplexing problem solved to a large extent. With contented labor and cow comfort and general sanitation throughout, the results, practical dairymen generally know, are more profits in the milk pail.

The barn is of tile construction with walls 8 in. thick, while the footings as well as the floors throughout are of concrete. The gable ends are of frame and the arched roof is self-supporting, thus affording plenty of unobstructed hay room in the mow. Many interesting details necessary for the enlightenment of the builder are shown on another page.

Cold and damp concrete floors have been said to cause rheumatism in cattle, but to prevent this the stall floors are covered with cork brick as an insulator. All the steel stall partitions and the stanchions are strong and durable, affording the least possible resistance to the circulation of the fresh air about the barn. The 4-in. pipe columns which support the hay-floor girders are in the same line with the stanchions.
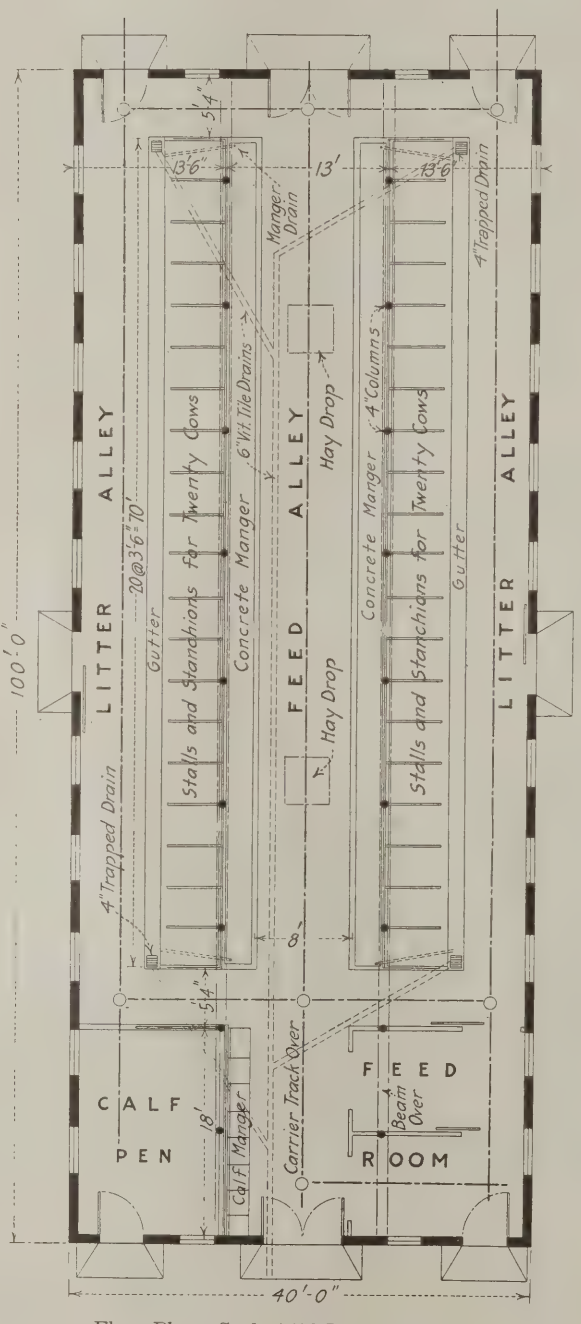
The hay-floor joists are 12 in. and are set 2 ft. on centers, being supported at the center by two girders built up with four 12-in. planks. The joists are lapped at the center or tied with a cleat and are bonded to the walls.

The rafters are 2 x 6 in. placed 2 ft. on centers.

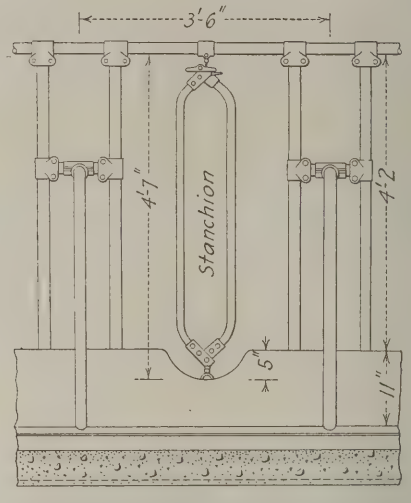


A Corner of the Barn with the Hollow Tile Crib and Hog House in the Central Background

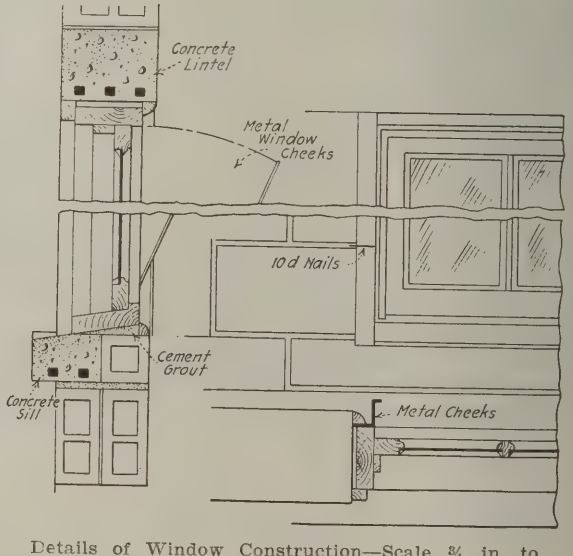
The roof arches were built up complete on the ground and were then hoisted into position. The hip bracing is shown in one of the accompanying details. This, as might naturally be supposed, must be solid and well spiked together. The lower end of the roof arches is also well spiked to the double wall plate, which is anchored to the clay tile walls every 6 feet. The tile walls and the roof are securely tied to the floor joists by a system of bracing, the details of which are here illustrated. The cows and is 6 ft. 4 in. in width, thus affording plenty of room for the men doing the chores. The gutter is 18 in., and for large Holstein cattle, such as are bred on the County farm, a 5-ft. stall is needed. For Jerseys or some of the smaller breeds a 4½-ft. stall would be satisfactory. The concrete mangers are 30 in. wide and the feed alley running through the center of the building is 8 ft. wide, thus giving sufficient width to enable teams to be driven through the entire length of the barn. One



Floor Plan—Scale 1/16 In. to the Foot



Rear View of Cow Stall, Showing Stanchion—Scale ⅜ in. to the Foot



Details of Window Construction—Scale ¾ in. to the Foot

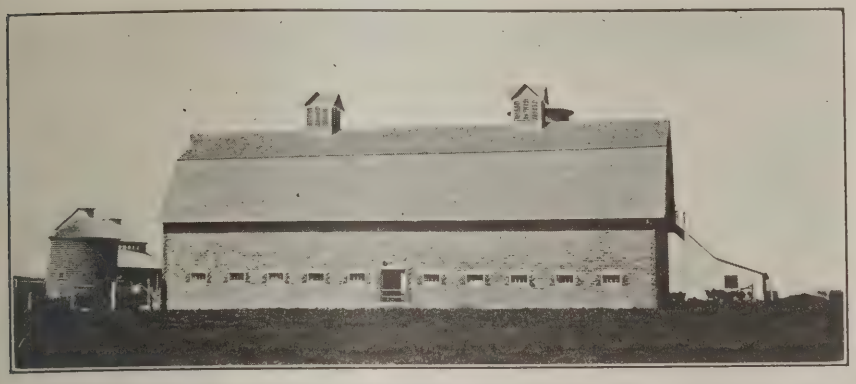
Floor Plan and Details of a Modern Barn for the Dairy Farm

brace system is located opposite each floor-supporting column, the columns being placed not more than 10½ ft. apart in the length of the barn. The hay floor is covered with shiplap flooring. The roof is covered with sheathing boards and cedar shingles.

An examination of the accompanying floor plan shows the position of the little alley back of the of the pictures presented herewith is a view looking down the center feed alley. The floor plan also clearly shows the position of the carrier track, as well as of the two hay chutes.

As will be seen from another picture accompanying this article, the barn is of attractive appearance, and may well be termed "a modern structure for

the dairy farm." The use of hollow tile has won great favor in all parts of Iowa, and there is hardly a farm in the State that is more than 50 miles from a clay products plant. The tile is secured at a reasonable price and the resulting buildings are very satisfactory. The tile walls are impervious to moisture, warm and dry in winter and cool in summer.



A Modern Barn for the Dairy Farm—A Side View with Crib and Hog House at the Left

How the Building Contractor Can Advertise and Obtain Results

"How can a general contractor advertise?"

Which, of course, means how can be obtain the right kind of publicity; the kind that will do more than fill advertising space and cost money—in a word, the kind that pulls?

The principles of advertising are the same whether you are endeavoring to sell books, bricks, or office buildings or seeking to get your name on the architects' lists, says a writer in an exchange. The only things that change are the manner and methods of publicity. A general contractor must therefore adopt methods suitable to his own particular business, which, by the way, is decidedly different from any other type of business, and must have its advertising done and copy written by men who understand, in a most comprehensive manner, the details and intricacies of the building trade.

Then, again, the advertising must be of a twofold nature, inasmuch as its appeal must reach both architects and owners—two different types of men, and in most cases with very little in common so far as their training is concerned.

To the architect, the builder's advertisement must appeal with such riveting force as to be ever before him. If not in a physical manner, at least mentally it must make a little dent in his mind and "ring the bell" at the psychological moment when the architect is making up his list of bidders, and the nearer the top of the list the better his chance of always being among the favored few.

You (Mr. Builder) may say that you already do enough estimating and are now working overtime trying to land jobs. Are you on the lists of all of the prominent architects, the men for whom you would like to estimate? Are you in a position to select the good prospects and avoid the poor ones? In a word, are you competing against men who do the same caliber of work that you are doing, or are you forced out of your class because you are not on the chosen lists? If you cannot answer these questions to your entire satisfaction, then you are ready for serious thought on the question of advertising.

Solid Stucco for Exterior Walls

An authority on the subject says the type of stucco construction that is giving the best results is that known as solid stucco. No sheathing is used, the lath being applied directly to the studding and plastered on both sides. Three coats are used on the outside and one on the inside of the lath. The first coat is usually about one-half inch thick, the second the same, and the same thickness is used for the back plaster. The finishing coat on the exterior is about one-quarter inch thick. This gives an exterior wall covering 1¾ in. thick with the metal lath so imbedded that the wall is practically a reinforced concrete slab.

A Miniature Steel Frame Commercial Building

What is said to be the smallest steel commercial building in the country is in course of erection on a triangular site, a fraction of a lot, at the southeast corner of Broadway and 129th Street, New York City. It will be known as the midget. Three stories high, it will front 27.7 ft. on Broadway, 14.4 ft. on 129th Street and 31.4 ft. on the rear line.

There will be a store on the street level and offices on the two upper floors. As it is necessary to utilize every inch of floor space, glass windows and doors will be placed flush with the building line.

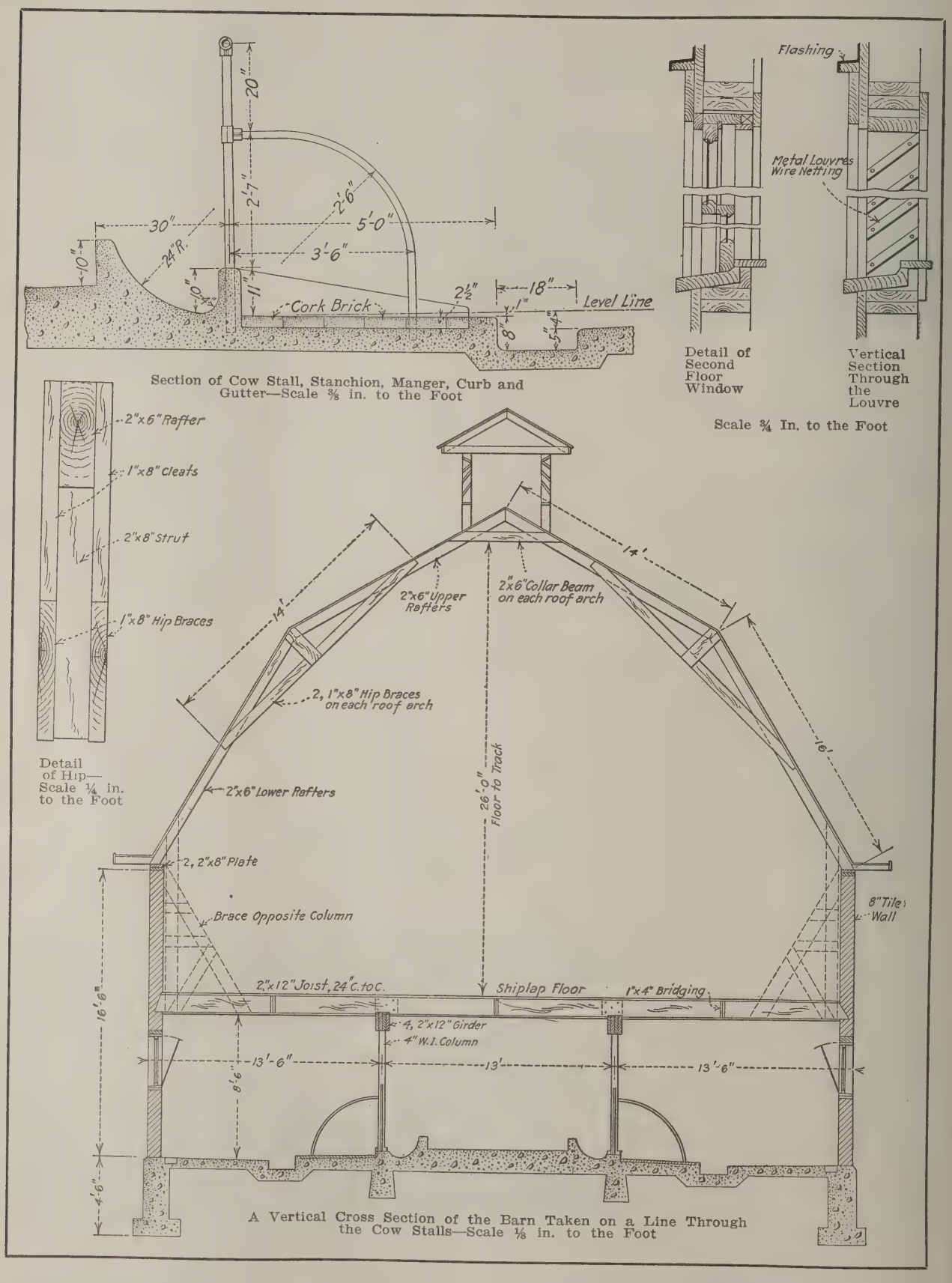


A View Looking Down the Center Feed Alley Showing Stanchions at Right and Left

The staircase leading from the street to the roof will be 2 ft. in the clear. That it might not occupy too much of the lot, it was necessary to make the

floor heights conform with the risers in the staircase. Comparatively speaking, the stairs will be nearly as perpendicular as a ladder. Wash room

alignment of streets in the Manhattanville section made years ago. Big tenements adjoin the property to the east. Because of its small dimensions build-



Miscellaneous Constructive Details of a Modern Barn for the Dairy Farm

facilities are to be on the roof and in the basement.

The building is estimated by the architects, H. Craig Severance and William Van Allen, to cost $6000. The gore is the result of changes in the

ers had no use for the gore, neither did adjoining owners, who thought that since no use had been made of the parcel the gore would serve to protect the light of their flats.

New Ideas About Concrete Floors*

Advantages and Manner of Laying—Adaptability to Ground Floor When There Is No Cellar

WHY do most people dislike concrete floors? Partly because we are all slaves to habit, partly because concrete floors are not what they really ought to be.

Twenty years ago I built for myself a concrete floor. I expected it to be cold. I expected it to be damp. I expected it to be all the uncomfortable things people said it would be. I found it warm and dry and all the comfortable things people had not said it would be. Best of all, I knew it would never harbor the vermin of sorts that infest old wooden flooring, mice that scamper at night, or the accidental cat.

The charges against the concrete floor are precisely those made years ago against the concrete sidewalk. We had come from dirt paths where feet find comfort in the happy medium between dust and mud, and the board sidewalk with its awkward surprises of heel-trapping cracks, loose nails and broken boards, to the smooth, hard, level cement. At first the rut-lovers wailed. But who would now go back to uneven board walks or the pleasant uncertain earth paths? In foreign lands where the cement walk is unknown, who does not pray long and loud for its revelation to all the world?

The Earth Floor

Perhaps the earth floor is the ideal thing, but we have passed that stage, and in the evolution of house-building the wood floor is finding a rival. Wood floors above ground without a basement are unhealthful. There is always a musty odor from the poisonous fungus growing on the wood and on the ground. The ground underneath an old house is poisonous to such an extent that plants will not grow in it. The soil from under a cement sidewall is very fertile.

Most concrete floors have not yet been developed beyond the sidewalk stage. If half the thought and time and money had been expended on perfecting the concrete floor that has been spent on developing wood from the rough board sidewalk to fine parquetry flooring, everybody would want the concrete.

Architect Should Overcome Popular Prejudice

To overcome the popular prejudice against concrete floors is the business of the architect. There are certain definite conditions to be observed in the laying of concrete floors. They are fundamental and in their strict observance lies the answer to the charge of the physical discomfort of concrete. After practical objections are overcome, attention may be given to esthetic considerations.

Concrete floors are usually laid free from the ground, with a dead air space underneath. In most of my houses the concrete floors are laid directly on the ground, doing away with air circulation under the floor and giving a more equal temperature. They are raised at least 21 in. above the surrounding ground, and particular attention paid to the preparation of the earth bed. After the foundation is laid the ground is puddled and tamped until very firm. Over the surface is spread from 4 to 6 in. of sand or sandy loam. Then the concrete is put on. If one part of the floor is below grade, the ground under it is carefully drained, after which the layer of sand prevents moisture from coming through.

Reinforce the Concrete

The main body of rough concrete should be reinforced to 1/3 of 1 per cent to prevent cracking, and scored to give a key to the top coat, and prevent its loosening from the bottom. The finish coat should be reinforced with No. 18 gauge half-inch mesh galvanized wire to prevent cracking.

From four to six weeks should be allowed for cement floors to dry. During this time there is a continuous process of absorption and radiation of heat until a mean temperature has been reached, after which the temperature of the floor is more equable than that of wood.

To cover a cement floor with wood is about as logical as to cover cement sidewalks with boards. Everybody who has lived on cement floors laid according to the given specifications has been wholly converted to them and would never again be bothered with the care and trials of wood floors. It is not, of course, expected that concrete floors should be left bare. They should be partly covered with rugs, the same as a polished wood floor. Incidentally, when properly laid, waxed and polished, cement floors are ideal for dancing.

When Cement Floors Do Not Scratch

When troweled and finished to a gloss, cement floors do not mar nor scratch. They should not be scored or marked off into squares or designs. The natural crazing of the top coat is far more pleasing. I have found no cement floor paint that produces a good effect. The hard monotonous flat colors are unpleasing, the paint soon wears off and shows the cement. Instead of using paint, I mix color with cement, usually tones of red and yellow, red and brown or yellow and brown slightly mottled. Tempered by the gray of the cement, these colors produce neutral tones that are a splendid background for rugs and furniture. When quite dry, the cement should be cleaned with a weak solution of ammonia and water, given two coats of Chinese nut oil to bring out the color, then finished with a filler and waxed like hardwood. Well done, this treatment gives an effect of old Spanish leather.

It is quite as impossible to tell how to lay a cement floor to bring out all its potential beauty as

*Reprint from an article by Irving J. Gill, architect, in *Sunset Magazine.*

it is to give exact rules for the painting of a picture. Specifications and instructions carry one just so far, but beyond that point each builder must study out the problem for himself. It takes the knack or the inspiration or the gift—whatever its name—that differentiates craftsmanship from mere mechanical perfection, that raises the artist above the artisan, to make a cement floor the thing of beauty it can and should be.

Before it has set, cement is a wonderfully plastic material, more wonderful than clay. It can be colored, modeled, shaded, surfaced, and then hardens into an everlasting expression of the workman.

The protest against ordinary cement floors is the unconscious demand for the thing well done. At heart we are never satisfied with any work that is not done right, and cement floors will not come into their own until architect and workman study them as an art.

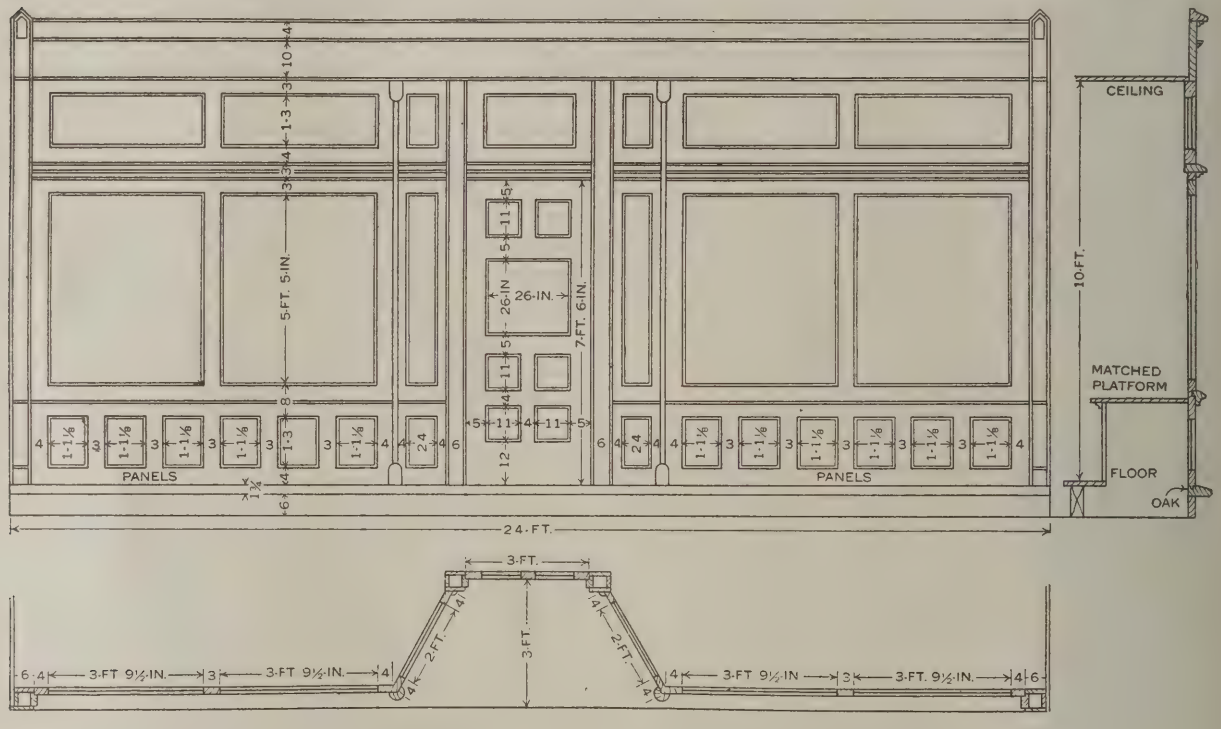
The cement floors in the home of Homer Laughlin in Los Angeles forecast the possibilities of the future. Sprawling there, his soul in his work, with great sweeps of the trowel an artist wrought in that plastic, responsive material, blending the colors marvelously in the broad central spaces, coaxing them to a rare harmony of tone and exquisite finish, and around the outer edges he carved in low relief the lines of acanthus and other simple conventionalized leaf forms. In the entrance hall, with big free strokes, he limned the feather-like fronds of a palm, using his color with consummate skill and an artist's feeling. The appeal of this most modern manifestation of ceramic art is far more subtle than that of the mosaics, which were the acme of floor making among the Greeks and Romans, and it has the singular advantage of being within reach of beauty lovers of moderate means.

Concrete floors are cheaper than wood for the first story; are enduring, require little care, are comfortable and healthful when laid right, and they can be more beautiful than any other floor.

Details of a Store Front

In the sketches presented herewith there is shown a detail of a store front, the idea being to indicate how such work can be billed out ready for the benchman to put together, saving him the time of making a rod and enabling him to see beforehand the piece of work he is about to make, says a correspondent of the *Wood Worker*. To begin with, the foreman or draftsman of the mill goes to the building and gets the outside dimensions of the store front. These he takes to his office and makes a ¾-in. scale drawing of the intended front, putting on all figures as shown, and billing it out according to this drawing, ready for the sawyer. This system has already been adopted by a number of better-class mills. It relieves the responsibility of the millman, who is more apt to make a mistake than the draftsman, who is accustomed to handling figures.

The drawing consists of an elevation and floor plan. This store front is made entirely of white pine, outside of the sill, which is of oak. It is needless to go further with any explanation, as the drawing explains itself.



Details of a Store Front as Used by the Mill Man in Billing Out the Work

Mammoth Hotel for New York City

If present plans are carried to completion, New York City will have in the near future an immense hotel, twenty-eight stories in height and estimated to involve an expenditure of $15,000,000, this sum including the cost of the site, which at present has not yet been determined. The plans have been drawn by Starrett & Van Vleck, Beverly S. King and Shiras Campbell. The construction work will be done by Hoggson Brothers, who will also equip the big hotel, which, it is understood, will have 2500 rooms and provide accommodations equal to any local first-class hostelry but at more moderate rates.

Selecting Woods for Interior Finish

Classes and Varieties—Characteristics and Uses of Woods—Those Most Suitable for Interior Trim

By John S. Edmund

IN the selection of the kind of woods to use for the interior finish or woodwork of a home, great care should be taken. The woodwork of the various rooms must be permanently satisfying, and help to make the surroundings homelike and comfortable. There is pleasure in possessing beautiful woodwork, as it gives refinement to the home and is the keynote for the rest of the fittings. The object in finishing woods by the various methods is not only to preserve them, but to bring out their wonderful beauty, thus developing the beautiful and irregular markings produced by nature. Nature has outlined the grain of wood with peculiar markings, some very faint and others more pronounced.

There are any number of our native woods which are used for interior woodwork, each having an individual beauty, color, sturdy texture and grain of its own.

Woods may be divided into two classes, namely; hard woods, which are both open and close grained; soft woods, which woods are invariably close grained. The hard woods that are most generally used for interior woodwork are as follows: Oak, ash, chestnut, birch and cherry. Soft woods: Pine, cypress, red gum, poplar and white wood.

There are two reasons why our native woods are used to such a great extent to cover almost all the wall and ceiling area of the various rooms of the home, first because the woods are easy to obtain, and second, owing to the fact that they are comparatively inexpensive.



Selecting Woods for Interior Finish—An Excellent Example of Stair and Panel Work

In the selection of a wood for the living room, library, hall or dining room, we should use one which has a decided marking or grain and a strong fiber. The woods which would be suitable are oak, gum chestnut or cypress. For bedrooms, sewing room or the like, the woods of a finer texture and less decided grain would be proper. For the kitchen, laundry or bath where the woodwork is subjected to both heat and dampness, cypress and white pine are much to be preferred, for it is well known they shrink, swell or warp but little.

We should be careful in specifying the wood, whether it is to be plain sawn or quarter sawn, as this will make a great difference both in the beauty, adaptation to their various uses and cost.

Quarter sawn oak is the best for interior woodwork, as it develops beautiful figures in the wood, is much finer in grain, has a stronger fiber or texture and is most interesting. When plain sawn the texture is much coarser and the wood is not so beautiful.

Chestnut when quarter sawn is just the opposite to oak, for it loses its beauty and interest, but when plain sawn is one of the most beautiful woods for interior woodwork available and is not quite so expensive as oak.

The markings of Southern pine are very beautiful and interesting when plain sawn and where the woodwork will not receive very hard wear is greatly desired for interior trim. For flooring, quarter sawn Southern pine, commonly called comb grained, is used to a great extent owing to its good wearing qualities, as it resists wear very successfully.

Chestnut is perhaps the most generally desired wood for interior woodwork. One reason for this is that there is perhaps a greater variety in the grain of chestnut than is to be found in any other wood. It has a wonderfully interesting color quality and lends itself to color treatment with readiness which gives delightful effects. It does not naturally incline to warp or check, works easy and stands well, so is to be desired for interior woodwork.

There are many varieties of oak, those mostly used being white and red oak, either of which are preferred when quarter sawn. Oak is one of the best woods for every purpose, especially for interior finishing and floors. The wood of the white oak is of a light straw color and that of the red oak has a reddish tinge, so that they cannot be used together for interior trim. Either wood answers practically as well if kept separate.

Birch and cherry are adapted to an endless variety



Selecting Woods for Interior Finish—Another Staircase Showing a Little Different Treatment

of finishes, and when properly treated, very beautiful results can be obtained. They are very often used to imitate mahogany. Both woods are very hard, heavy and of a fine texture and are particularly suited for moldings and fine woodwork, as they cannot be obtained in very wide boards.

Almost all the maple used in building comes from the sugar maple tree. The wood is heavy, hard, of a fine texture and often has a wavy grain known as curly. The wood is of a creamy white in color and works and stands well. The curly or bird's-eye maple is one of the most beautiful of our hard woods, and at present is used extensively for fine interior finishing. Some of the handsomest chambers are finished in bird's-eye maple.

Ash is used to a great extent and is gaining in favor for interior woodwork. It has a beautiful close grain, considerable less marking than chestnut, is heavy and stands well. Ash is the cheapest of hard woods and is much easier to work than oak.

Poplar or white wood used very often to imitate some of the more costly woods, such as cherry, is of a fine texture, creamy white in color and can be secured in very wide boards free from knots. There is considerable grain in the soft woods which, if brought out, is very handsome. Some very beautiful and decorative effects can be obtained from these woods if they are developed properly.

At the present time the most extensively used soft wood for interior trim is cypress. This wood, like maple, very often has a curly grain. The color varies from a light to a dark brown. It can be secured in very wide boards, and because it has no natural tendencies to shrink or swell, it is used to a great extent for paneling.

Red gum wood is also used for interior trim. The wood is rather soft and is commonly cross-grained, but of a very fine texture. It is a very handsome wood, and shows at its best perhaps when it is quarter sawn. When plain sawn it is not so good, owing to its tendency to warp.

Simple Test for Porosity of Brick

A simple test for brick porosity consists of holding the tongue lightly in contact with the brick, says a writer in the London *Building World*. If a distinct suction is felt the brick will be very porous. If no appreciable suction is apparent but the moisture rapidly dries from the surface of the brick, it is but slightly porous.

Bricks made by the semi-dry process—that is, by compressing the clay in the form of a damp dust—absorbs only about 5 per cent of water, though they vary greatly in this respect. Engineering brick absorb less than 1 per cent of their weight of water. For all ordinary purposes, therefore, it is not desirable to designate bricks which absorb less than 15 per cent of their weight of water, on immersion, as particularly porous.

During the last few years the use of hollow blocks and hollow bricks has extended rapidly. These are much lighter than solid bricks and effect an important saving in railway carriage, but they must be distinguished from porous bricks. The weight alone is not a sufficient guide, as hollow bricks are now made which are indistinguishable in appearance from solid bricks. When cut or broken their hollowness is easily seen. On the continent porous bricks are defined as having a weight which is notably less than common bricks, but this definition will have to be abandoned now that hollow bricks are made in large numbers.

The large hollow bricks used in fireproof floors, etc., are usually made of highly porous material. This not only reduces the cost of carriage and the weight of material in the structure, but it facilitates the manufacture of bricks accurate in shape and free from twists.

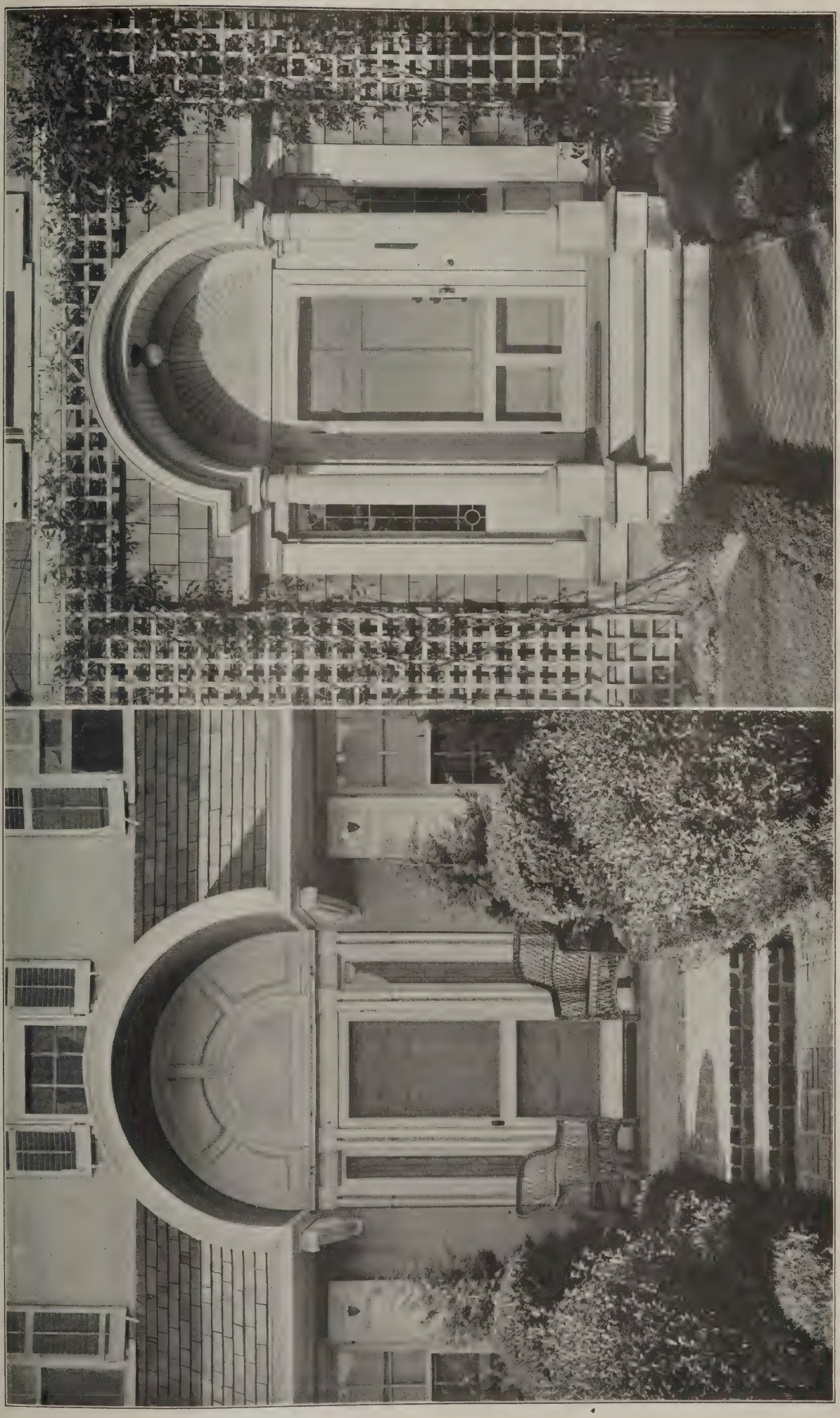
The Forest Service states that approximately 330,000 cords of wood waste of a value of $1,400,000 were utilized in 1914 by thirty-five of the two hundred pulp and paper mills of the United States.



Door and Window Treatment as Exemplified by Main Entrance to an Apartment House in Chicago



Two Entrance Doorways Which Present Striking Contrasts in Their Detailed Treatment Yet Retain Features of Similarity in Their General Design



Contrasted Treatment of Circular Headed Entrances of Two Country Homes at Douglaston, New York. Note the Effect of the Lattice-Work, Which Frames the Doorway Shown in the Right-hand Picture



Designs of Modern Door Knockers, Handles, Etc.—Photographs Courtesy of Russell & Erwin Mfg. Co.

Points for Apprentice Bricklayers

Treatment of Joints—Many Walls Marred by Uneven Bed Joints—Faults to Be Avoided

By W. H. Hefelfinger

THE appearance and stability of any brickwork is largely determined by the joint. The treatment of the joint may make a good-looking brick look decidedly bad, or it may make a common brick look very attractive. In most buildings the brick and kind of joint are chosen by the architect; but sometimes, especially in small work, it is left to the bricklayer, who often chooses the cheapest way or the one with which he is most familiar, regardless of results.

If the following facts and rules are kept in mind, no bricklayer will ever make any serious mistake in regard to combination of brick and joint:

Never use a trowel struck joint with a rough brick, or a rough joint with a smooth brick. A weathered joint should never be used except on a large brick, like paving brick or a rough brick.

The best results with rough, light-colored brick are obtained by using a rough raked out joint of white mortar, and with a smooth press brick, a trowel struck, round, "V" shaped, or a smooth raked out joint.





Figs 1 and 2—The Proper and Improper Way to Hold the Trowel When Striking the Cross and Bed Joints

Points for Apprentice Bricklayers

With a dark rough brick use a flush rough joint of white mortar and a rough raked out joint for colored mortar. With a smooth dark brick use a trowel struck, round, V-shaped, or a smooth raked out joint. Wide joints look better than narrow joints with most brick. Very narrow joints, are practically obsolete in new work.

Colored mortar with light colored brick is not considered a good combination to use.

The smooth trowel struck joint is the most used, but it is far from being the easiest to strike right. A large percentage of bricklayers do not make a good trowel struck joint, partly, I presume, because they do not think it necessary to make it any better and also because of haste and lack of proper training. In Figs. 1 and 2 are shown the proper and improper way of holding the trowel in striking the cross and bed joints. When striking up from the inside of the wall always hold the top of the trowel toward you in striking the cross joint, and away from you in striking the bed joint; strike the cross joint first, then the bed joint. Particularly notice the angle which the trowel makes with the wall. This should be about 30 degrees.

Here is where a great many make a mistake; they hold the heel of the trowel too close to the wall, which cuts off a lot of mortar that should be pressed into the joint. The more the mortar is compressed in the joint, the better joint it will be.

Always hold the trowel in the same horizontal position and move along the wall as you strike the joint. Don't stand still and gradually raise your arm as you draw the trowel along the wall. After you have gone along the joint once you should run the point of your trowel back along the edge of the brick to clean off any surplus mortar, and then draw your trowel along the joint the same as you did the first time. This will give a smooth, uniform joint as at "A" in Fig 3.

The weathered joint is struck with the trowel and the same theory applies as in ordinary joints, only the slant to the joint is reversed, the object being to shed water the better as at "B" in Fig. 3.

The round joint is struck with a round iron called a jointer. The tool is shown at "A" in Fig 4. The main point in the use of this tool is to see that it is not too small in diameter for the joint or the result will be a very uneven joint. Also see that the edges are clean and smooth. This joint is also struck up by using a piece of hard wood thin enough to run between the brick and about 18 in. long as at "B" in Fig. 4; one edge of this piece of wood is rounded off. At "C" in Fig. 3 is a round jointer joint.

The V-shaped joint is struck with a jointer having a diamond-shaped cross-section, as shown at "C" in Fig 4. Be sure the jointer is larger than the joint. These jointers are often made with a round on one end and a diamond on the other. "D" in Fig. 4 shows a tool round on one end and diamond-shaped on the other and "D" in Fig. 3 shows

the general appearance of a V-shaped joint.

A smooth raked-out joint is first raked out to an even depth of ¼ in. and then smoothed up with a square iron or jointer (shown at "E" in Fig. 4) that will run freely between the edges of a brick, as at "E" in Fig 3.

Smooth recessed joints are also made by placing strips in the joint while the brick are being laid, then removed when the mortar has hardened enough to keep the brick in place.

A rough raked out joint is made by raking out the joint with a tool, as at "F" in Fig. 4, or with a large nail. The joint is shown at "F" in Fig. 3.

A flush rough joint is made by leaving the mortar just as it is when you cut off the mortar that has been pressed out from the joints in laying the brick. Be sure all joints are filled flush with mortar and no smooth trowel marks show. "G" in Fig. 3 shows joint.

The appearance of these joints depends much upon their uniform thickness and the neatness with which they are struck.

One habit that most apprentices form will cause them lots of trouble and that is laying brick too close to the line. In any kind of brickwork you always want a little clear space between the line and the brick. Never allow the line to touch the brick anywhere except on the corners. It is the only way to get straight walls. The proper distance to keep from the line in ordinary brickwork is about ⅛ in. and for stock brick about 1-16 in. One of the reasons for laying brick tight to the line is that apprentices, finding it difficult to keep down to the line, begin to lay brick high in the back in an effort to keep to the line, which throws the bottom of brick in; then to avoid so much set in the brick, they push the brick out a little each course, so that by the time they get three or four feet high they may be an inch out of plumb.

To avoid laying brick against the line always glance along the bricks you have laid to see that none touch the line. Very often this fault is due to haste and carelessness.

I have seen walls get out as much as two inches in a height of four feet. The bricklayers were union men at that. This was due to haste, but as I said before, do not sacrifice good work for speed. Remember,—the more haste, the less speed.

The appearance of a good many brick walls is marred by the uneven bed joints, which are usually caused by letting the line sag and then trying to take it up in one course. On a long wall it is impossible to pull a line tight enough to be absolutely straight. The weight of the line causes it to sag. To avoid this sag a few bricks should be laid in form of a lead somewhere near the center of the wall. This is called a trig. To get the trig level with the corners one of the corner

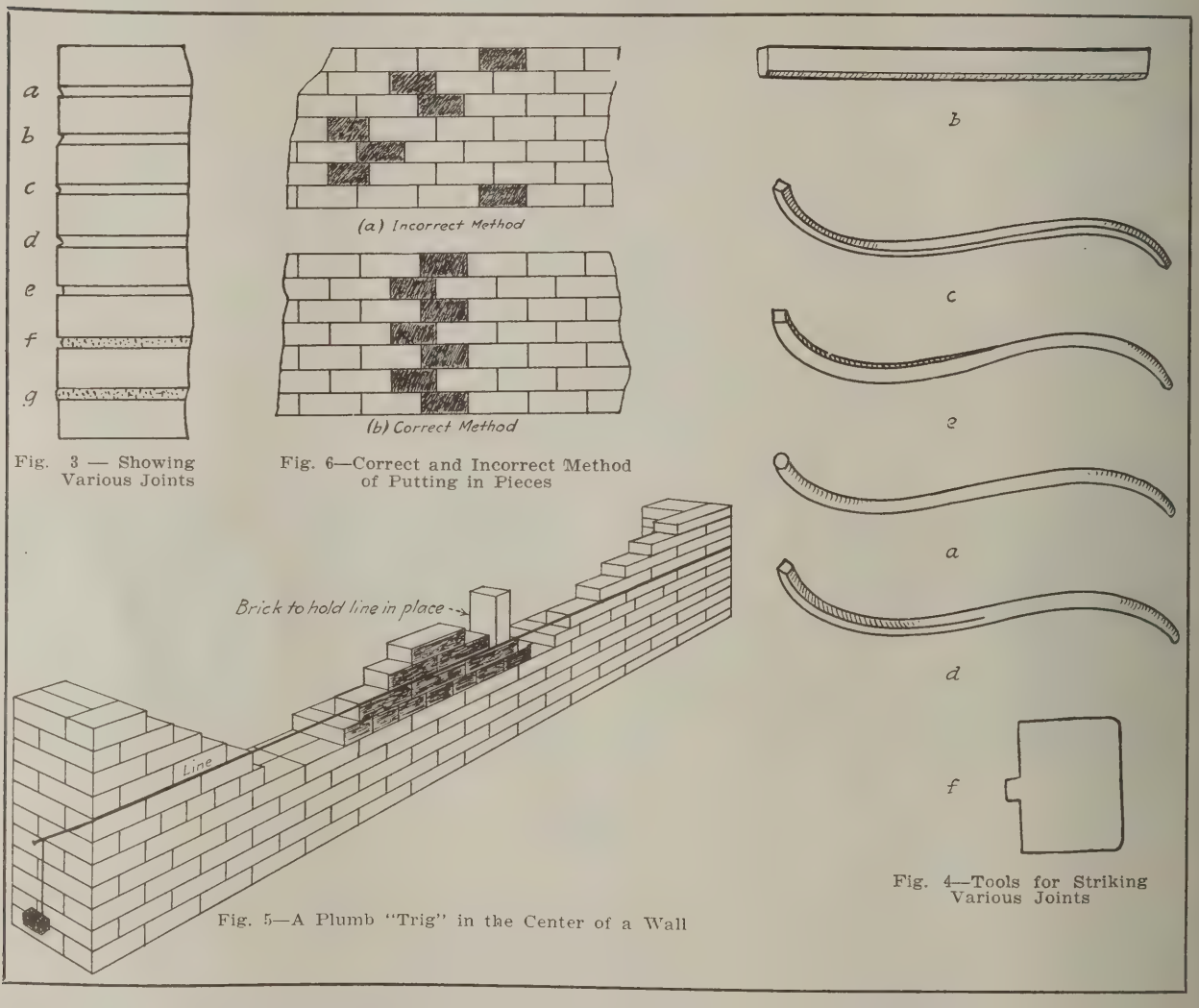


Fig. 3 — Showing Various Joints

Fig. 6—Correct and Incorrect Method of Putting in Pieces

Fig. 5—A Plumb "Trig" in the Center of a Wall

Fig. 4—Tools for Striking Various Joints

Points for Apprentice Bricklayers as Described by Mr. Hefelfinger

men should sight from corner to corner while one man is building the trig so it can be laid level with the corners. The trig should always be plumbed if it is built more than one course at a time. Laying just one brick for a trig each time the line is raised is not good practice on anything except a rough party wall or a wall to be plastered. Fig. 5 shows a plumb trig in the center of a wall.

Very often walls will not work out whole brick and a piece must be put in; these pieces should always be larger than a half and come directly over each other and not laid here and there or where two bricklayers come together on the wall. Fig. 6 shows the right and the wrong way, shaded brick representing pieces. Of course, in a large blank wall it does not make much difference.

In any small building the walls should always be laid out all around so that so far as possible pieces may be avoided; those that are put in should come under the window frames and places where they are not conspicuous.

Never lay just a half brick on the face of the wall; it is better to put in two ¾ brick.

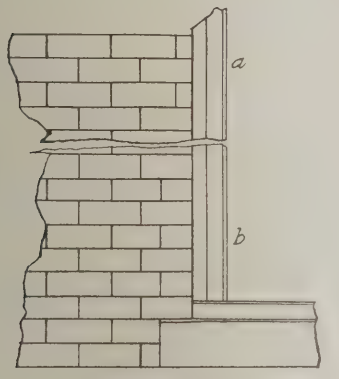


Fig. 7—Showing How to Lay Brick Against a Frame

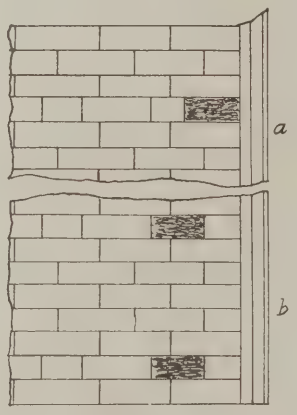


Fig. 8—Showing a Mistake Often Made

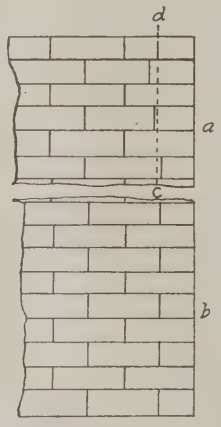


Fig. 9—Putting End of Brick to the Line

Points for Apprentice Bricklayers—Correct and Incorrect Methods of Laying Brick

In laying brick against a frame of any kind it is always best to avoid small pieces like those shown at "A" in Fig. 7. The bond shown at "B" in Fig. 7 is much better. Sometimes in laying up small pieces they seem to get narrower and one must clip a brick to get it in. In this case clip the second brick from the frame. "A" Fig. 8 shows a mistake often made. "B" shows the best way to lay it.

Wherever a half brick is needed against a frame or jamb, put the end of the brick to the line; by doing this you always keep the piece the same size, which greatly improves the appearance of the wall along the frame. Fig. 9 illustrates this point. The dotted line "D C" shows where joint would be if end of brick was used instead of pieces of different lengths.

Properties of Concretes

An interesting paper dealing with the properties of concrete and Portland cement mortars which includes the results of about 20,000 tests of about 300 aggregates consisting of limestone, granite, gravel and trap rock, which are used for concrete materials in various parts of the country, has just been issued by the Bureau of Standards, Department of Commerce, Washington, D. C.

The results are of special interest to building contractors, architects, engineers and others who use concrete, since it points out that with the same aggregate a variation in strength of as much as 100 per cent may result owing to a lack of proper precaution in mixing and placing the materials. The effect on the compressive strength of each of the factors, such as type of aggregate, method of mixing, method of molding, the consistency, the density, the method of storing or curing conditions, abnormal methods of curing, characteristics of the aggregate, proportions of cement to aggregate, the age, etc., are studied separately and the results are shown in tables and diagrams.

One of the most important conclusions to be derived from the results is that the use of too great an amount of mixing water, which is common in present-day construction, accounts for many concrete failures. The use of an excessive amount of mixing water may result in a reduction in strength as great as would result from a reduction of 50 per cent in the amount of cement used. The results indicate that proper methods of mixing and fabrication are as important as good cement and aggregate in producing a concrete of the best quality.

Unique Commercial Building

Plans were filed some days ago for a commercial building embodying unusual features and to be erected at the northeast corner of Seventh Avenue and Thirty-seventh Street, New York City. Construction work, however, is to await a definite settlement of the New York City zone system.

The structure is planned to consist of a main building 100 ft. wide, 98.9 ft. deep and twenty-one stories high. On each of two sides of this will be a wing 72 ft. wide and 98.9 ft. deep, forming an integral part of the building. One wing will be ten stories high, the other eleven stories, and the roofs of these wings will be used as a recreation space for workers, women having the use of one side and men of the other. The building will have a total frontage of 244 ft. on Thirty-seventh Street and 98.9 ft. on Seventh Avenue.

The upper five stories are given the external appearance of a single unit by pilasters, and is surmounted by a hip roof. The facade is to be of brick, limestone and terra cotta. The estimated cost is placed by the architect at $987,650.

Use of Wall Board in the Bungalow

Valuable Suggestions for the Carpenter, the Contractor and the Builder—Some Pictures of Interiors

By Joseph A. Poesl*

THE bungalow is popular for the reason that it has a pleasing way of informally combining the healthful out-of-doors with the snug in-doors, and that, being simple in appointments and on one floor, it is easily cared for.

The perfect bungalow embodies simplicity, beauty and comfort—each an essential quality. Characteristically, the exterior is low and squatty with liberal porch space. And much of the charm of the bungalow is due to its low proportions. A large living room with the rest of the rooms compactly arranged describes the interior plan.

Many of the finest bungalow interiors are finished throughout with wall board, although it is used for any type of dwelling from the inexpensive summer cottage to the most pretentious mansion.

The beauty, the durability, the adaptability of wall board are the real reasons why it is so extensively used in the bungalow. It is not the cost which is of prime consideration, but the value received. And wall board is full value from the standpoint of service rendered.

Wall board is especially suited to the type of bungalow modeled after the adobe ranch houses which the Spanish built in the early days when they colonized the Southwest. The rooms are low and have simple paneled walls and ceilings. No other interior treatment will do so well as paneling, for only one color scheme is used throughout. Without panels the result would be monotonous. Paneling, such as wall board permits, enables the owner to obtain variety by merely changing the design for each room.

Then, too, the atmosphere of coziness and comfort created by paneled walls and ceilings is in direct keeping with bungalow ideals. Wall board made it possible to secure this treatment without prohibitive expense.

In every bungalow, however, special attention is given to the decoration. The owner finds it readily susceptible to his expressions of utility and artistic value; in fact, more so than in any other type of dwelling.

The furniture in many bungalows is designed and built in exact accordance with the owners' desires. Of course, this is only possible because of the plain furniture suitable for the bungalow. But here is the point: with rooms paneled with wall board it is easy to match the decorative strips with



Fig. 1—*An Interior Where One's Ideals Are Carried to an Extreme but with Good Effect*

*Mr. Poesl is also the author of the article entitled "Wall Board for the Summer Cottage," published on pages 60 and 61 of the July issue.—Editor The Building Age.



Fig. 2—An Interior Where the Decorative Strips of Paneling and the Woodwork Match the Furniture

the furniture, in line and general style. Thus one more step is advanced in the direction of attaining an ideal decoration. An unusually good example of this is shown in Fig. 2 of the accompanying illustrations. Note the beams on the ceiling particularly; also the decorative strips of the wainscot of grained wall board. Both are in perfect keeping with the neat furniture and other woodwork.

Wall board bungalow interiors not only make possible unrivaled decorative treatment, but satisfy the demands of well-built walls and ceilings as well. And as expressions of individual taste they are highly desirable, as is evident in Figs. 1, 3, 4 and 5.

The extent to which one's ideals may be carried out to actuality with wall board is shown in Fig. 1.



Use of Wall Board in the Bungalow—Fig. 3—Another Interior Where the Board is Used to Good Effect



Fig. 4—An Attractive Interior Showing the Striking Effects That May Be Obtained With Wall Board

True, it is extreme, but attractive, nevertheless. In Fig. 3 is shown a ceiling treatment common to summer cottages; it is, however, adapted to the bungalow, particularly where a simple rustic decoration is sought. Two attractive bungalow rooms are illustrated in Figs. 4 and 5.

Most bungalows have large attics which cannot be utilized for living accommodations on account of being close under the roof, where the stifling heat of the sun in summer has easy access. The fact that this attic space is practically wasted is the real reason why bungalows, as a rule, are more costly than the regular dwelling for the same habitable space.

Now, by finishing the attic, perhaps putting several bedrooms in it, not only is the cost of the building greatly reduced, but its value is also thereby increased, and wall board is just the thing for attic rooms. Its well-known non-conductivity of heat prevents the sun's heat from penetrating



Use of Wall Board in the Bungalow—Fig. 5—A Decorative Frieze Above the Panelling of the Walls

into the rooms, which means comfortable rooms. Being easily cut with a saw or knife, the board can be readily fitted into the many nooks and corners found in every attic. It can be readily applied directly to the roof rafters. Most important, though, is the fact that it is clean to handle and put up. How many home-owners have given up the idea of finishing their attics, or are hesitating to do so, because of the dread of the muss, litter and inconvenience that always accompanies lath and plaster work? Wall board removes this drawback.

Sight must not be lost, however, of the other advantages of wall board when considering those that make it particularly suited to bungalows. It is easy to apply, and when once on, the decoration can begin immediately. There is no long delay as is necessary when plaster is used. It is durable, will not chip or crack. Rooms finished with it are attractive and sanitary. By using a good oil paint to decorate it a damp cloth will readily cleanse it. There are many more reasons for using wall board, but what have been given are no doubt sufficient to convince even the most skeptical.



Interior View of Carpenter Shop of George W. Leiter at Buchanan, Mich.—Showing Motor Driven Saw Rig.

A Well Equipped Carpenter Shop

It is a well-known fact that carpenters and builders throughout the country are daily realizing that in the long run it is profitable to purchase mechanical equipment capable of facilitating production and reducing construction costs. The concrete mixer has enjoyed a remarkable growth in recent years and the woodworking machinery field has seen a steady increase in the marketing and selling of numerous labor-saving devices. One of the most popular models in this line is the saw rig, because of its many uses, portability and comparatively low initial and maintenance cost. A man who has found an equipment of this character indispensable in the successful conduct of a business amounting annually to about $20,000 is George W. Leiter, a carpenter and builder in Buchanan, Mich. As shown in the illustration, which represents an interior view of his shop, the saw rig is set up near the center of the floor and occupies very little space.

The building in which it is housed is a brick structure measuring 24 x 45 ft., being well lighted by large windows on each long side and at either end. The shop has sufficient dimensions to accommodate a plentiful supply of lumber, which is kept where most convenient to the workmen. On the far side of the room is seen a workbench, located beneath the windows, thus giving the carpenter plenty of light for his operations. The saw rig is located about the center of the shop, so that no time is lost in carrying materials to and from the machine to the bench. The rig is operated by a 2-hp. electric motor, which the owner prefers to a gasoline engine. Mr. Leiter purchased the equipment from the Oshkosh Mfg. Co., Oshkosh, Wis., and when occasion requires the saw rig is taken out on the job, as was the case recently when Mr. Leiter took the contract for carpentry work on a new foundry in Buchanan. For supervising the progress of work and for carrying lumber, tools, etc., Mr. Leiter utilized a Ford car with a truck arrangement in the form of a large box at the rear. The truck has been built to carry 800 lb. without any trouble, and has been used successfully for five years. Particular advantages are found with this class of truck because of the fact that it may be converted into a pleasure car at any time, while in either case the cost of operation and maintenance is very low, comparatively speaking.

Five-Room Bungalow of Moderate Cost

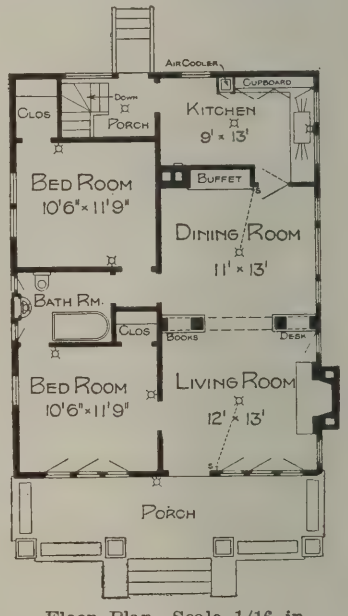
Our Supplemental Plate Design Well Adapted for the Suburbs, the Lakeside or the Seashore

WE have taken, as the subject for our supplemental plate this month, a design of bungalow with five rooms which is likely to appeal to prospective builders in all parts of the country. According to the specifications of the architect, all footings, walls and piers are to be of concrete, mixed in the proportion of one part Portland cement, three parts sand and four parts broken stone of a size to pass through a 2-in. ring. A 3-in. tile drain is to be laid around the foundation and connected with sewer.

There are to be two chimneys with wall 4 in. thick. The flues are to be 7½ x 7½ in. in the clear for one outlet and 7½ x 11½ in. for two outlets, all flues to be plastered on the inside and laid in cement mortar. The fireplace chimney is to be built outside the frame wall and is to be anchored to the frame work with iron anchors every three feet. The fireplace is to have a trimmer arch to support the hearth, the arch to be of brick or concrete at least 20 in. wide and the full length of the chimney breast. The fireplace is to be lined with fire brick and the face to be built up with pressed brick laid in colored mortar. The exterior brickwork of the chimneys is to be of ruffled brick.



Front Elevation of the Building—Scale ⅛ In. to the Foot



Floor Plan—Scale 1/16 in. to the Foot

A Five-Room Bungalow of Moderate Cost

The framing lumber is to be Oregon pine or its equal, depending somewhat upon the part of the country in which the home is built. The mud sills are to be 2 x 6 in. and the floor beams 4 x 6 in. The first floor joists are to be 2 x 8 in. and the ceiling joists 2 x 4 in., both spaced 16 in. on centers. The exterior studs are to be 2 x 4 in., also spaced 16 in. on centers.

A double floor joist is to run lengthwise under partitions. All spaces between joist and partition shall be blocked the full depth of the joist with solid block 2 in. thick. Where the floor joist is not in one piece it is to be spiked over bearings. Partition studding are to be 2 x 4 in. spaced 16 in. on centers and there is to be a single plate at the bottom and a double plate at the top composed of 2 x 4's. The stud walls and partitions are to have 2 in. bridging between the floor and ceiling. All corners are to have diagonal bracing on the stud walls and partitions. The walls are to be furred out where soil pipes occur. Double headers are to be used for windows and doors. All the framing is to be thoroughly trussed.

Shiplap 1 x 6 in. is to be nailed horizontally over the exterior walls, and on this is to be placed a two-ply building paper, which is to receive ⅜ x 6 in. redwood or cedar shakes laid 12 in. to the weather. If shingles are used they should be exposed 6 in. to the weather.

The rafters are to be 2 x 4 in. and the collar ties 1 x 6 in., all laid 32 in. on centers. Over the 1 x 6 in. sheathing is to be placed a two-ply building paper and this in turn to be covered with shingles exposed 4½ in. to the weather. The top and sides of all openings are to be flashed.

The porch brickwork is to be of red ruffled brick laid up in black cement mortar, pointed. The porch and buttress caps are to be of smooth cement 4 in. thick and colored to match the porch floor. The floor is to be of concrete.

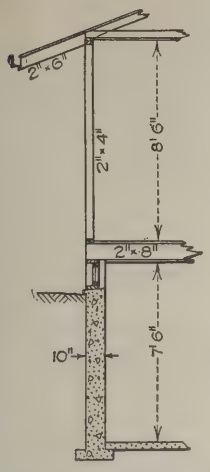
The subfloors are to be of 1 x 6 in. pine, laid diagonally, and covered with a two-ply building paper. Living and dining room surface floors are to be ⅞ in. quarter sawed oak flooring, blind nailed every 8 in. All other floors are to be of pine.

The exterior trim is to be of clear pine and all interior finish is to be of slash grain pine. The dining room is to have a plate rail and a wainscot

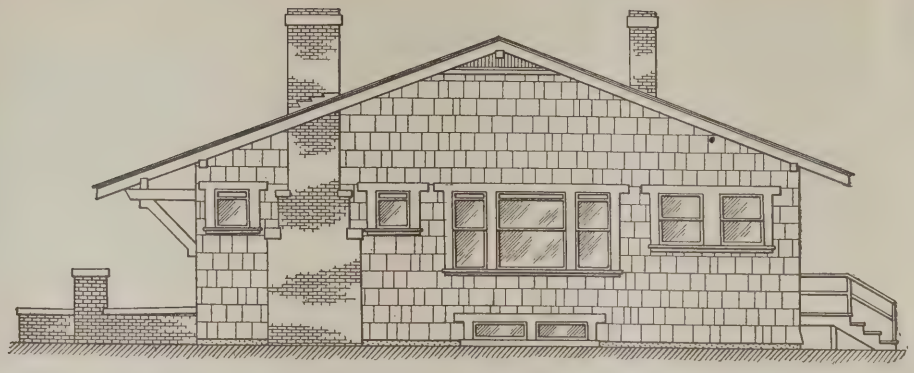


An Attractive Five Room Bungalow of Frame Construction well adapted for the Suburbs, the Lakeside or the Seashore. Plans may be obtained in accordance with the description presented in this issue.

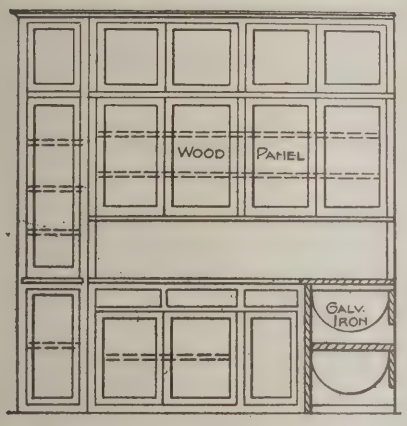
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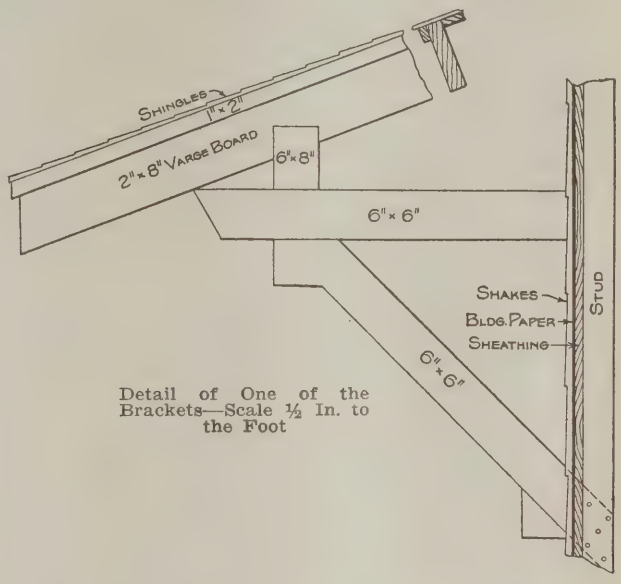
Section Through Main Wall—Scale ⅛ In. to the Foot



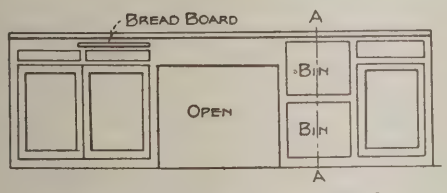
Right Side Elevation of the Building—Scale 3/32 In. to the Foot



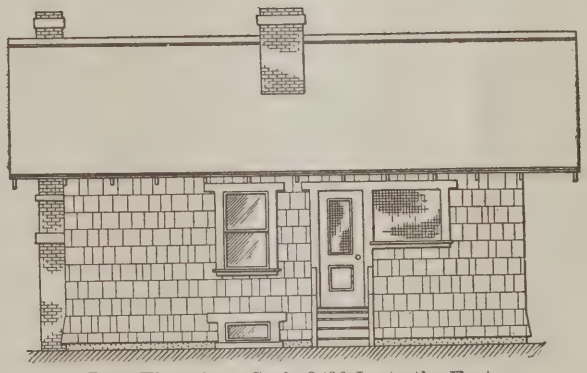
Elevation of Cooler and Cupboard with Section of Kitchen Sink on Line A-A



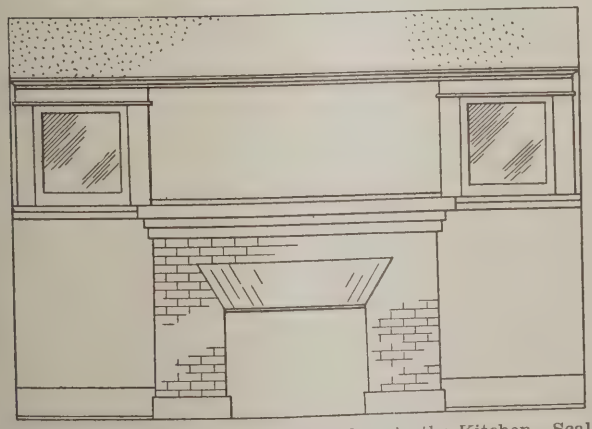
Detail of One of the Brackets—Scale ½ In. to the Foot

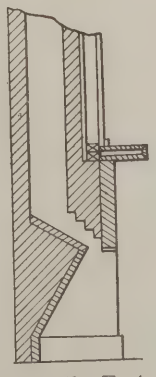


Elevation of the Sink in the Kitchen Scale ¼ In. to the Foot

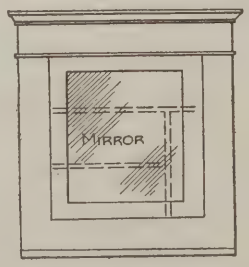


Rear Elevation—Scale 3/32 In. to the Foot





Elevation and Section of the Fireplace in the Kitchen—Scale ¼ In. to the Foot



Medicine Cabinet Over Wash Bowl in the Bathroom — Scale ½ In. to the Foot

Miscellaneous Constructive Details of Five-Room Bungalow of Moderate Cost

which shall be 4 ft. 6 in. high with 1 x 12 in. boards and ⅜ x 2½ in. bottens. A chair rail is to be run at the top of the hardwall plaster in kitchen and bathroom.

There is to be a built-in desk and a bookcase in the opening between the dining and living rooms as shown in the details. All built-in work is to have mitered and glued corners and to have a casing run around them.

The Plastering

All plastering is to be sand finished excepting in the bathroom, which is to be wainscotted 6 ft. 8 in. high with smooth, hard wall plaster troweled down to a smooth finish. All sand finish plaster surfaces are to be sized and tinted.

The woodwork in the living and the dining rooms is to receive one coat of stain, one coat of filler and two coats of flat varnish. All other woodwork to have three coats of flat white and one coat of best white enamel.

The front door is to be glazed with beveled plate glass and all other doors are to be of five panel Colonial type. The buffet is to have glazed beveled plate glass doors and plate glass mirror.

The kitchen sink is to have lap front drawers, doors, bins, shelves and breadboard. The sink top and back are to be constructed with rough lumber covered with chicken wire which is to be covered with composition. The "cooler" closet is to have removable wire screen shelves and a wire screen vent at top and bottom to run to outside of building.

The Bathroom

The bathroom is to contain a medicine cabinet, with ½ in. shelves and 1⅛ in. door glazed with beveled plate mirror. The closet is to have a vitrous china tank, wash down bowl, white enamel seat and cover. Tubing, fixtures, etc., are to be nickel plated. There will be a 5 ft. porcelain enameled bath tub with a 3 in. roll rim.

The house is to be piped for gas and wired for electric lighting and call bells.

All surface woodwork is to be painted with three coats of white lead and linseed oil. The roof shingles are to be stained green. Exterior siding is to receive two coats of silver mixed paint. Ceiling of porch and under side of eaves are to be given three coats of white lead and oil. The screen porch floor and back steps are to receive three coats of best floor paint.

Arrangement of Rooms

An examination of the floor plans shows that the front door opens into the living room, which is connected with the dining room by means of a wide opening. To the left of the entrance is a bedroom which connects directly with the bathrroom, as does also the other bedroom which opens off the dining room. A rear porch provides entrance to the kitchen and to the cellar.

Blueprints of this design covering plans, elevations and various constructive details all drawn to convenient scale for the builder, together with typewritten specifications, can be obtained for $10. In ordering, a request should be made by the prospective builder for design No. 680.

The Metamorphosis of the Attic

The attic of delightful childhood memory still may be found in old-fashioned homes where father uses a "mustache cup" and a plush-covered photograph album with a heart-shaped mirror and brassy clasps occupies a prominent place on the "center" table, says a writer in the *Hoggson Magazine*. But for the most part, the attic, as we recall it, is a thing of the past, a thing of hallowed memory and romance.

Of course, there has been a more or less appreciable movement by certain modern-day pseudo-poets to popularize attics by inhabiting them, and calling them Somebody-or-Other's "Garret," but this is purely an effort to create an interest in bad verse. No, attics will never be in again.

But we digress. The old-fashioned attic! Well might it have been called the heaven to which all good and much-loved things went when they "died." And this happy hunting ground of the wornout provided the early idea of Paradise to the children of the house. It was a veritable treasure trove and its wonders were never exhausted. The lost, the strayed, the forgotten, the cast-off, all found their way there. Truly, to dust they returned.

Broken dishes piled up on the table that had suffered the loss of a leg and leaned its sagging weight on a box of sea shells and corals, the gift of a seafaring uncle; Jimmy's hobby horse, which had fallen in the battle of boyhood against babyhood, stood forlorn and alone. Sabres took on a coating of rust, as did the brace of heavy army pistols hanging from rusty nails. Trunks and toys, furniture and old clothes, books and . . . ! But why enumerate? This is not an inventory.

A visit to the attic was an adventure calculated to entrance with delight, and thrill with fear, the daring explorer. From the vantage point of the top step the musty smell and the stillness of the atmosphere portended deep and unfathomable mystery—anything seemed possible in such a place.

In the dim light, rows of headless figures hung along the wall; it was Bluebeard's forbidden room. In a dark corner, a wicked animal crouched; two bright spots gleamed out viciously, and when a surprised and frightened mouse scurried across the floor, well, who wouldn't close the door and run!

But there was no resisting the subtle lure of the unknown. Summoning new courage and a playmate as reinforcements, another attack was made and boldly pushed to a successful completion. But how disappointing for the moment, when more intimate investigation disclosed the headless figures as old military uniforms and army caps! And the eyes of the wild beast proved to be only a glint of sun on the shining knobs of a pair of old brass andirons!

The attic then accommodatingly became a safe retreat, and afforded in its many volumes of yellow-leaved books the desired thrills for excitement in the stories of other's adventures.

Splendid though were the attic's possibilities as a theatre. Cords stretched from rafter to rafter, a couple of old sheets, and there was a curtain. Now the old hair-covered, nail-studded trunks were truly treasure chests filled with the most gorgeous costumes any cast need wish. The only requirement was that a skirt be long enough to sweep out behind

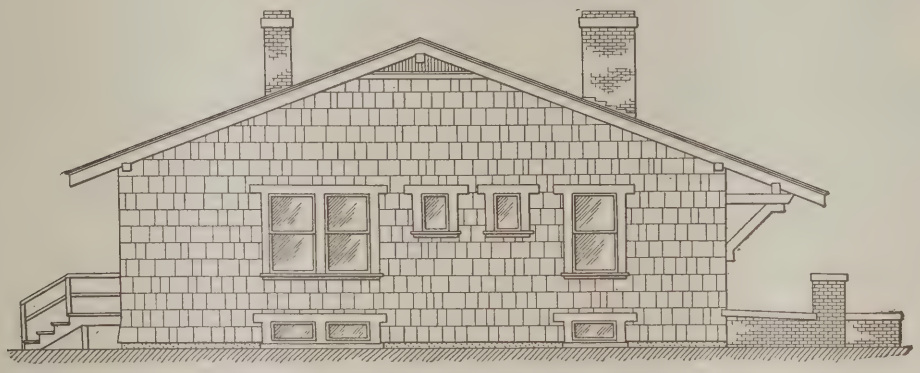
and drag heavily on the floor as the heroine moved. A large feather, drooping sadly from the large hat brim, gave to Hamlet the necessary melancholy air. A train for the heroine and a feather for the hero! It was enough. Of what use is imagination?

And as for playing house!

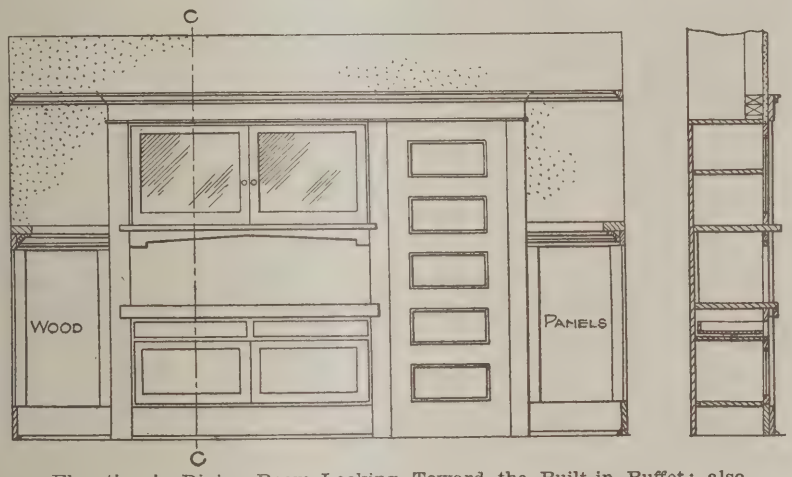
Shall we shed a tear of regret at the passing of the old-fashioned garret, fragrant with its dried herbs and steeped in an atmosphere of romance? No, for nothing has been lost to the children who have, by prior right, title, inheritance, and custom, the first call and privilege to that portion of the house.

The attic now provides the home with the most delightful of play rooms, that show in every detail a thorough understanding of what a child loves. It is a retreat that is their very own, just as they would have dreamed it. If you told them that the alcoves were formed by chance in the plan of the big house, they would smile incredulously. There is an alcove for each child, where each has her own individual set of furniture, decorated with her own story-book pictures. All of them delight in the quaint Kate Greenway figures on the walls and hangings, and the blackboard against the chimney piece.

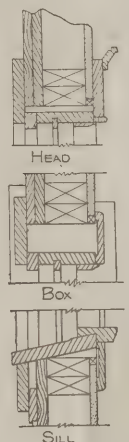
Deep shelves furnish cages in which the wild animals sleep at night; and the tired hobby horse finds a stable and rest. Baby has a playground all her own, out of danger from prancing steed and



Left Side Elevation of the Building—Scale 3/32 In. to the Foot

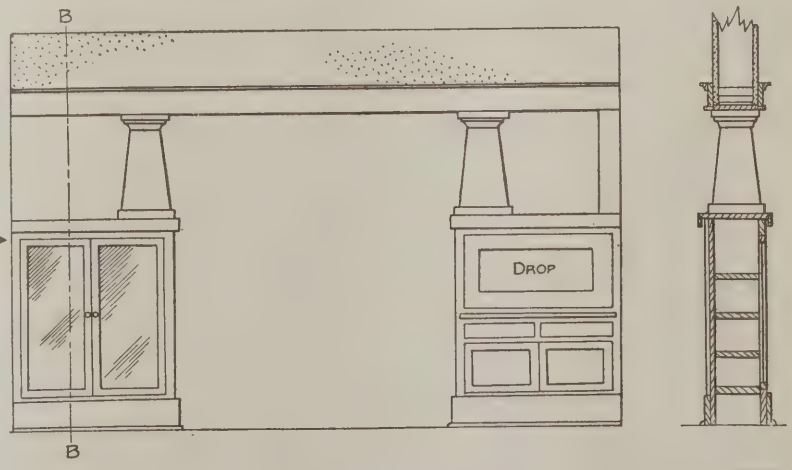


Elevation in Dining Room Looking Toward the Built-in Buffet; also Section on Line C-C—Scale ¼ In. to the Foot



Details of Window Frames—Scale ⅜ In. to the Foot

Opening Between the Dining Room and the Living Room with Book Case at the Left and Writing Drop at the Right; Also a Section on Line B-B. Scale ¼ In. to the Foot



A Five-Room Bungalow of Moderate Cost—Elevation and Miscellaneous Constructive Details

ranging elephant. There is a quiet corner for nurse, too, fitted out with a low chair and table where she sits with her mending basket. The possibilities of the attic for a playroom are unlimited and just now coming to be realized. It is a place of enchantment.

What wonderful things are to be seen from the high-up windows where the sunbeams peep in to wake the toys! Perhaps the view may show ships far out on the river or bay, or miles and miles of tree tops tossed in the wind, and soft, white, piled-up clouds. When out walking with nurse in the park or grounds, there isn't so much to see; just a little bit close by, and here is a look over the whole, wide world, which is so full of things to make stories about.

Repairing Plastered Walls in Australia

An account of how plastered walls are repaired in Australia may not be without interest to American builders and we therefore present the following from the *Australasian Decorator and Painter:*

"To repair a plastered wall prior to repainting offers a few minor features to which reference here may not be out of place. A good job is impossible if cracks show, as they have a habit of doing unless properly treated. Where defects are many it is better to secure the services of a plasterer than to trust them to workmen who may not only fail to do the work properly but may take a great deal of time over the job.

"In the case of bulges or loose plaster it is necessary to pick out the defective parts completely down to the bare laths, and also extending the cutting process half-an-inch or so on to the surrounding plaster. There should be no sharp points or loose plaster near the edges of the patch. It is well to shape the cut-out portion round, and level the edges inward so as to give the new plaster a grip. In stopping the hole the main consideration is to forestall the possibility of the patch shrinking and assuming a lower level than the surrounding surface.

"To avoid this it is necessary to do the work in at least two operations. First, mix the plaster with a proportion of coarse sand. Wet the laths and the edges of the old plaster thoroughly, apply the first coat of plaster, and level with a straight edge. Allow to dry hard before finishing with plaster containing no sand. The plaster used may be either plaster of Paris and whiting (half and half), Keene's cement or one of the new plaster preparations. If the patch is large, one requires to follow the practice adopted by plasterers and use the straight edge and wood float, finishing by trowelling the surface of the plaster with the edge of a plasterer's steel trowel until the surface is dry and hard, applying water freely to the surface during the process.

"In stopping cracks the same process may be adopted, or modified if the cracks are small. Cracks if other than miniature require to be cut out, that is to say, deepened and straightened so as to neutralize the possibility of one edge being lower than another, and to provide a good grip for the stopping. Cracks stopped without being cut out usually show a bevelled edge which is almost as bad as are unstopped cracks. By widening a crack it is less apt to show when properly stopped. In stopping it is well to substitute for stopping knife blades of wood shaped like a chisel knife. Steel knives leave marks which usually show up clearly under coats of distemper or paint."

Convention of Sheet Metal Contractors

What is regarded as one of the most successful conventions ever held by the National Association of Sheet Metal Contractors took place in Peoria, Ill., on June 20 to 23. Many interesting papers and addresses were presented which contained constructive suggestions and provoked much valuable discussion that enable the delegates to return to their local associations with enthusiasm and determination to carry out the recommendations which were made. Particular attention was given to the apprenticeship question, and an unusually interesting feature was an exhibit of work done by boys in different sections of the country.

Trade development was also considered and Secretary Allen W. Williams of the National Warm Air Heating & Ventilating Association told of the progress made by the furnace makers in educating the public to the value of properly installing furnace equipment.

The election of officers resulted in the following choice for the ensuing year:

President.....George Harms, Peoria
1st Vice-President....Frank B. Higgins, St. Louis
2nd Vice-President....Herman H. Lind, Cleveland
3rd Vice-President.....T. T. Walsh, San Antonio
4th Vice-President.Otto Guessenhainer, Milwaukee
Secretary.....Edwin L. Seabrook, Philadelphia
Treasurer.....W. A. Fingles, Baltimore

There were also elected three trustees to serve for a period of three years.

In the contest for the place of meeting for the 1917 convention Cleveland was an easy victor over Chicago and Peoria.

New York Office of Portland Cement Association

By amendment to the constitution of the organization so long known as the Association of American Portland Cement Manufacturers, the name has been changed to Portland Cement Association with head offices in the Conway Building, 111 West Washington Street, Chicago, Ill.

The Association has recently opened a New York office in the Architects' Building, 101 Park Avenue, which is in charge of Louis R. Ferguson. With the addition of this office the Association now has five branch offices, the others being in Atlanta, Kansas City, Dallas and San Francisco.

The large hotel built on the grounds of the Panama-Pacific National Exposition at San Francisco, Cal., and which was constructed principally of white pine and steel, was sold for 16,000, the original cost having been about $225,000.

"If rooms be square, their height should not exceed five-sixths of the sides, nor be less than four-fifths, but in oblong chambers it may be equal to their breadth," is the opinion of a writer of colonial days prominent in architectural matters.



Some Aspects of Modern Shingling*

Treatment of Gable Ends—The Standing Gutter and Shingled Cornice—Finish at the Ridge

By Edward H. Crussell

ON the ends of gable roofs the shingles are usually allowed to project over as they do at the eaves, or say about 1 in. Many workmen are able to keep a straight line up the gable by the eye alone, but as nothing looks much worse or is harder to correct than a mistake at this point it is better to use a guide.

The guide may be either a line stretched from top to bottom at the correct projection, as was done at the eaves, or it may be a strip of the correct thickness tacked temporarily to the end of the roof boards. Where a strip is used the amount of projection may be varied slightly in order that a piece of the ordinary 7/8 material may be utilized. The strip need not be more than 3 or 4 ft. long, held in place with a couple of nails and moved up the gable as required.

The strip is, perhaps, better than the line for the novice, because there is a tendency to crowd the line out of place by keeping the shingles too close to it. On the other hand, the writer knows of an instance where a strip had been tacked on the full length of the gable to serve as a guide, and when the time came to remove it, it was discovered that in this case the novice had nailed all his shingles to the guide strip. Not here and there a shingle, but every one of them, and the edge of the roof after the strip was taken off had a rather interesting but undesirable fringe of nails.

One method of getting a straight line up the gable the writer saw used some years ago, but does not recommend. In this instance the workman let the shingles project over any way at all, just as they happened to come; when the ridge was reached he snapped a line down the gable at the correct projection and cut off the shingles to it with a rip-saw. As stated however, I do not recommend it.

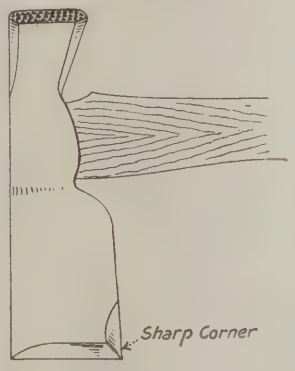


Fig. 27—Showing Sharp Corner on Hatchet

In finishing the courses at the gable it is, in most cases, better to lay the outside shingle first, so as to do any trimming that may be necessary on the shingle next to it.

Most workmen can understand why a double course of shingles is always needed at the eaves, although many of them overlook the fact that even with the first course doubled it is still the weakest or most vulnerable section of the roof—every other course but it, in a properly constructed roof, consisting of three thicknesses as is shown in Fig. 19, which represents a sectional view of the lower portion of a shingle roof drawn to scale.

When the roof has a standing gutter, as shown in Fig. 20, a doubled course is also needed above it, for the same reason that one is needed at the eaves. The writer has known of this fact being overlooked by an experienced mechanic simply be-

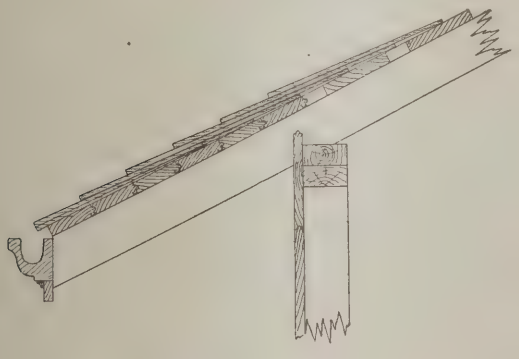


Fig. 19—Section of Lower Edge of Shingle Roof

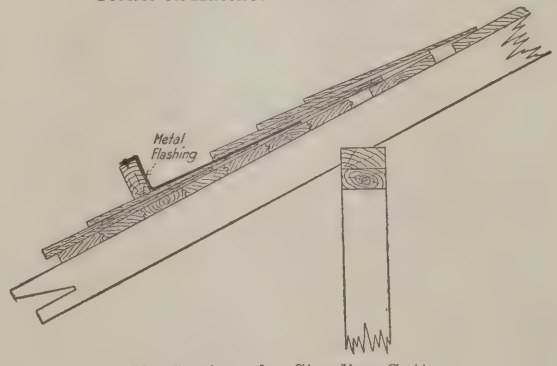


Fig. 20—Section of a Standing Gutter

Some Aspects of Modern Shingling—Treatment of the Gable Ends and Standing Gutter

*Copyrighted, 1916, by Edward H. Crussell.

cause this style of gutter was new to him, although he had done plenty of shingling.

So much is being said in this series about mistakes that the reader might possibly be led to suppose the writer had spent his life among a class of



Some Aspects of Modern Shingling—Fig. 21—Shingle Roof with Every Fifth Course Doubled

workmen who never did anything but make them. Such is not the case, the facts being that a carpenter may work for years in the larger cities, and be a good and thoroughly experienced mechanic without ever having been called upon to lay shingles. This is often overlooked by the foreman or person in charge, who consequently does not always give the shingling the amount of supervision it deserves.

Mistakes in shingling are hard to rectify. Imagine the roof shingled to the ridge, or even half-way up, before it is discovered there is only a single row of shingles above the gutter. How would you go to work to correct such a mistake? It isn't likely that this could happen more than once to the same executive, and the only reason for speaking of it here is so that those who have not yet had such an experience might be able to profit by the experience of those who have.

Besides those places already mentioned as requiring double courses, it has, of late years, become the practice to insert them at regular distances all the way up the roof, making, say, every fifth or sixth course a double one. This practice is shown very clearly in the picture, Fig. 21. It has the effect of breaking up the monotonous appearance of a large roof, giving it a certain style and character of its own, but care is needed in the arrangement. The roof space should be equally divided and the double rows not too far apart, or instead of improving the appearance they are likely to suggest that the shingler forgot to remove his toe-laths.

Another style of modern shingle roof decoration is that of curved eaves and edges as pictured in Fig. 22. There seems to be different ideas regarding what this style of shingling is meant to represent. Combined with a Colonial style of architecture and properly arranged and colored, it gives something of the effect of Spanish tile. With another style of architecture and arrangement it gives what is known as a thatched roof effect. In striving after this thatched roof effect some rather unique shingle arrangements have been attempted, one of which is shown in Fig. 23.

It is hardly necessary to say that the gage and hatchet method is of little use on work of this kind, and although to the uninitiated it may seem easy, anyone who has attempted it knows different. It is the sort of work that calls for the patience of Job, combined with an artistic temperament. Perhaps the best method of lining the courses is to make three or four short patterns of different degrees of crookedness and interchange them in whatever order seems best. The patterns should be of such a length that they can be held with one hand while the other hand runs a pencil the full length of them. The shingles in the picture were cut and arranged according to a detailed drawing, one man on the ground cutting and numbering the different courses, another on the roof laying them. Fig. 24 is a picture of another portion of the same roof.

Shingles laid on round corners must be well nailed—the butts as well as the tops. They will also, in most cases, require soaking in hot water until sufficiently pliable to bend to the curve without splitting. Steaming would be better, of course, but is in most cases out of the question because of lack of facilities. For the hot water, an easy method is to set up a galvanized iron wash tub on a few bricks, fill it with water and keep it hot with the cuttings that are always to be found where woodwork is being done.

Fig. 25 is a picture of a church on which, as can be easily seen, a considerable quantity of this round shingling had to be done. The shingled cornice on this building is another feature worthy of note; it is, perhaps, shown more clearly in Fig. 26, which is a rear view of the same edifice. This view also shows the top of the spire omitted from Fig. 25.



Fig. 22—Shingle Roof with Rounded Edges

The spacing of the last few courses of shingles on a roof usually needs to be varied slightly in order that there may not be an extra wide or narrow course at the finish. Where ridge boards are used the width of them should be taken into consideration and the courses arranged so that the last one shows

the correct width of exposure from the lower edge of the ridge board.

In addition to varying the courses at the ridge it is well to check up every once in a while as the work progresses and see if the courses are running parallel with the ridge. Where several men are working on a long roof it is easy to get quite a variation unless this matter is attended to. On old roofs it is no unusual thing to find the variation in the roof itself.

The easiest method of checking up is with a rod, one long enough to reach the entire distance. Or, if the distance is too great for a rod, use a steel tape. Measuring with rule and pencil is to be avoided as being worse than useless. Large nails or spikes may be driven into the ridge of the roof to butt the rod against and assure the measurement always being taken from the same point.

Many roofs are finished with a row of shingles laid lengthwise instead of ridge boards. This method was used on the building pictured in Fig. 21, though it may not be readily discernible in the reproduction. The ridge shingles are usually of the same width as the courses and are laid from each end of the roof so as to finish in the center.

There is a little kink to be mentioned in connection with cutting off the ends of the last courses of shingles that project over at the ridge. The carpenter usually takes a saw for this purpose, but the best and quickest method is to have a sharp corner ground on the rear edge of the hatchet, as shown in Fig. 27, and cut the shingles by drawing this corner over them, while exerting pressure on the head of the hatchet with the other hand. Only those who have tried it or seen it used will believe how quickly shingles can be cut by this method. It isn't always necessary to cut the shingles right through; if they are scored deeply enough a tap with the hatchet or the edge of the hand will break them off.

(*To be continued*)



Fig. 23—Rear View of House Shown in Fig. 24



Fig. 24—Roof So Laid as to Give the Thatched Effect

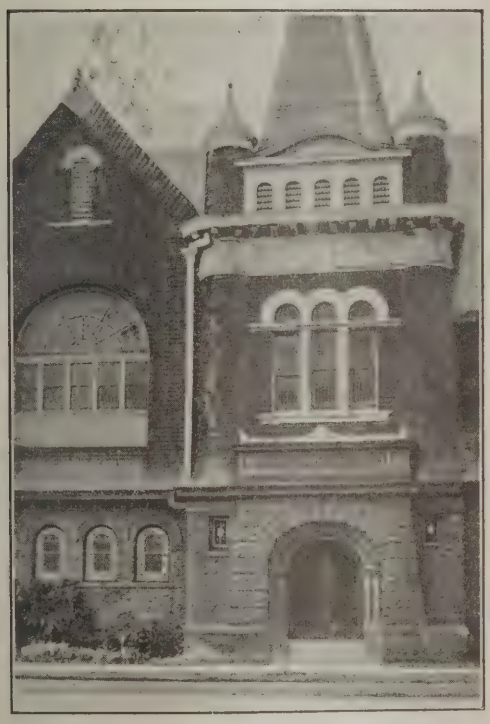


Fig. 25—Church Tower with Shingled Corners

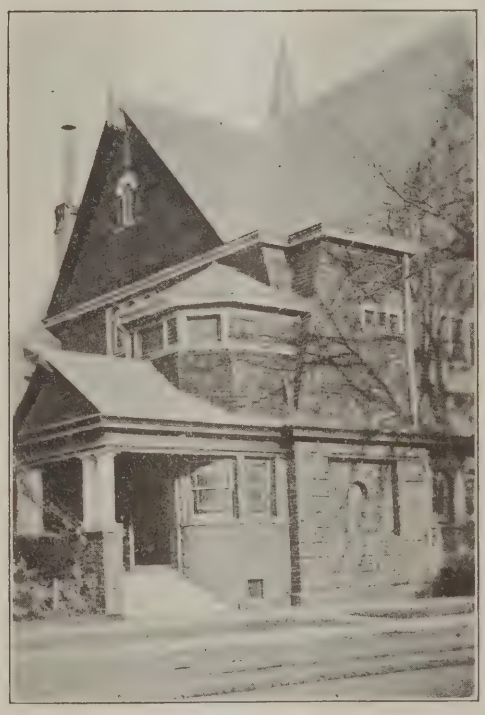


Fig. 26—Rear View of Fig. 25, Showing Shingled Cornice

Some Aspects of Modern Shingling

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Marking Centers for Lattice Screen for Porch

From W. M. L., Orange, N. J.—Will some of the practical readers of the paper kindly tell me how to mark centers for diagonal latticing of a porch screen?

Answer.—The following comments in regard to the above query are furnished by W. S. Wilkin: From the question of the correspondent I take it he intends to nail the lattice together without any frame and place it on a porch between the rail and lintel to support running vines. If this is the case each piece must be marked or laid off in some way. If he has a large floor space he can make a drawing of the panel as shown in the accompanying sketch, and nail up over this. Then take a straight-edge and mark the sides to saw off after it is nailed together.

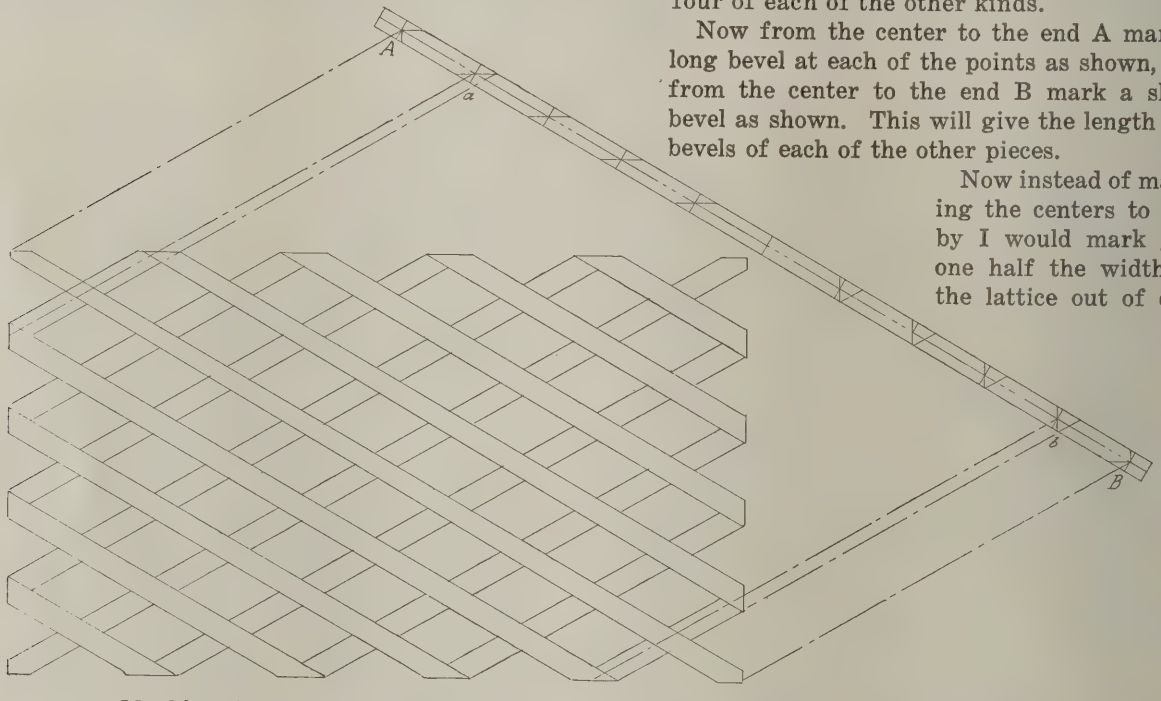
I think the way I have shown is the best way to go at it. First find the width and height of the screen; then decide how many pieces to run through. I have used nine. Now find the diagonal length of the screen, which may be done by mathematics or by the use of the steel square. Next take a strip of the lattice and lay off this length as shown from A to b. If he is going to use nine lattice pieces divide this length into ten equal spaces, square across at these points and run a line down the center of the strip.

Find the bevels on the ends of the lattice; then take the long side of the screen on the blade of the steel square and the short side on the tongue. The blade will give the long bevel and the tongue the short bevel. Set the T-bevel to this and mark both ends of the strip as shown at A and B. This will give the exact length and bevel of the long piece.

There will be two pieces just like this, for the lattice can be turned over. If both sides were not alike he would have to make them in pairs and keep the face side one way. There will be four of each of the other kinds.

Now from the center to the end A mark a long bevel at each of the points as shown, and from the center to the end B mark a short bevel as shown. This will give the length and bevels of each of the other pieces.

Now instead of marking the centers to nail by I would mark just one half the width of the lattice out of center, then he can always bring the edge of the lattice to this line when he is nailing and can see what he is doing.



Marking Centers for Lattice Screen for Porch—Sketch submitted by Mr. Wilkin.

It will be seen at A on the A end of the rod that the long bevel will give the point to mark off the side of the lattice. He can stand several pieces of lattice on edge, and clamp them together and use the steel square to mark them on the edges. The short bevel will also give the side of the lattice, but not the same side on the same edge of the rod. Naturally we want all marks on the same edge of the strip so as to save turning it over when laying off, and we want all marks on the same side of the lattice when we begin nailing it up or we may get things mixed and get some on the wrong side of the line.

In order to do this right, find the bevel between two pieces of lattice—in this case it is the same as the short bevel, but it will not always be the

same. To do this, take the long side of the screen on the blade of the steel square, and the short side on the tongue; then mark on the long side. Reverse the square and mark on the long side again; that is on the blade. The intersection of the two lines will be the angle the lattice pieces will cross each other.

Lay off this bevel on the B-end of the rod, as shown at B. If the correspondent wishes to mark the center of the lattice, instead of the sides, he can do it, for he will see that each point on the rod marks the center of the lattice.

Designs of Cobblestone Bungalows

From Louis Miller, Arcadia, Mo.—Thinking that some of the readers might possibly be interested in the several bungalows which I planned and built not long ago, I am sending a few pictures of them, together with the floor plan of one of them. The buildings are constructed of what is known as a mountain nigger-head porphrey cobblestone of an iron color, with brick corners and concrete belt course at the floor line. The front



A Street View Showing the Pergola at the Corner



A Detail of the Cobblestone Porches

and back porches have concrete floors, while the balasters are constructed of a buff colored cobblestone and capped with a concrete coping. The different colored rocks form a pleasing contrast and give rather striking effects.

The roof is covered with shingles creosoted red in color. The chimney is of cobblestone construction lined with brick. The windows are of the casement type with concrete sills.

The inside finish is of pine, white enameled. The doors are of the regular bungalow type. The furniture is all white enameled and the walls are tastefully decorated in water colors.

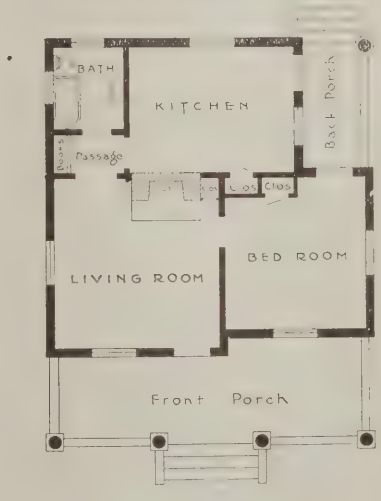
It may be interesting to state that Acme plastering was applied direct to the walls inside without any furring strips whatever, and water and dampness have never as yet been known to go through the walls.

The buildings are fully equipped with running water and provided with electric lights and are rented to summer visitors.

I would say that Arcadia is situated in the Ozark Mountains, ninety miles south of St. Louis, and nature intended it for a summer resort for tired people. The scenery is fine and the best of water gushes from the foot of the mountain.



A Side View of the Bungalow of Which the Floor Plan is Here Shown



Floor Plan of the Bungalow Shown Above

Designs of Cobblestone Bungalows as Constructed by Louis Miller

Some Comments on Shingling

From John Upton, La Fargeville, N. Y.—I have been much interested in the series of articles on modern shingling now appearing in current issues of the paper, and I am prompted to offer a few comments on the subject. In this section of the country we use 2 x 4's for roof staging. Now instead of following the method described in the April issue and sawing off the shingles after the roof is finished, we nail a few shingles to the 2 x 4's in such a way that they will come on the under side, butts up, and then nail these to the roof on top of the regular shingles. This method will leave a few small holes in the top shingles but this may be easily remedied by driving up

a bit the shingle that is immediately under it.

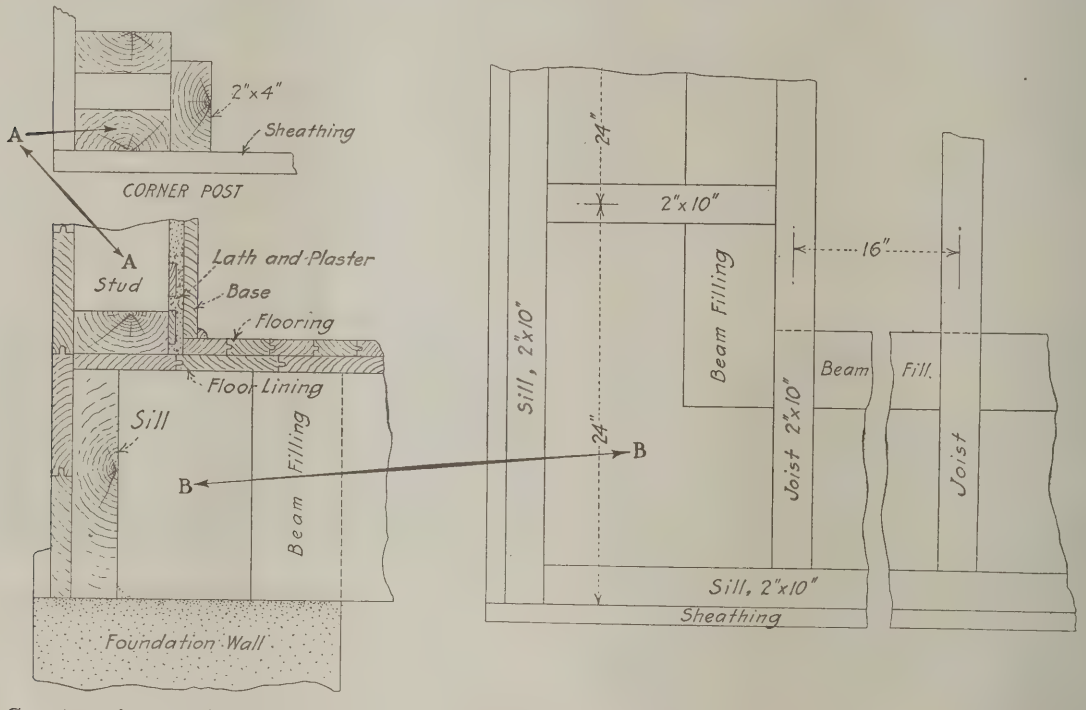
On steep roofs we sometimes set the 2 x 4's on edge and put on other shingles from the top edge down to the roof for braces. I have used this method on roofs with a rise of 20 in. to the foot.

Some men will use a 2 x 4, a 2 x 6, or even a 1 x 8 set on edge on roofs that are only of moderate pitch, but I prefer a 2 x 4 put on flat as I have described. Some use the iron brackets and like them.

In shingling we do not use a hatchet with a gage but a hammer, and strike one or two lines with a chalk line as a guide, or else we use a straight edge. By using a short piece of board 5 in. wide laying loose on the straight edge we can run two courses at a time.

stains are caused in many cases by allowing old chimney or sooty bricks to be laid in the walls. They will show a yellow stain through the plastering and also the paper. It may be that an old paving brick will sometimes find its way into the wall where old bricks are used and it will show for a long time a damp spot on rainy or sultry days. If the bricks are covered with a good coat of gas tar before plastering they will never stain either paper or white coat.

If the walls are damp from other causes, remove the plastering, brush off the wall with an old broom, give it two good coats of the tar and then replaster over the tar. The dampness will not show through the plaster. The latter will adhere to the tar the same as to the bricks.



Construction of sill and corner post as described by Architect W. H. Blair of Janesville, Wis.

Construction of Sill and Corner Post

From W. H. Blair, Jamesville, Wis.—I am sending herewith a tracing of the form of sill and corner studs which I have used for some years and found to be the most satisfactory of any method which has come to my knowledge. When well pointed on the inside of the sill piece and beam filled it makes a perfect seal forming a dead air space. When the studs are well spiked in the form shown, they make a solid corner preventing the plaster giving way.

Preventing Old Brick Work from Discoloring Wall Paper

From M. C. D., Baltimore, Md.—In reference to the inquiry of "W. W.", Baltimore, Md., regarding some method of treating old brick work so as to prevent the discoloration marks coming through the wallpaper, and which appeared in the May issue, I take pleasure in describing a remedy which I am sure will produce satisfactory results. The stains are caused in many cases by allowing old chimney or sooty bricks to be laid in the walls. They will show a yellow stain through the plastering and also the paper. It may be that an old paving brick will sometimes find its way into the wall where old bricks are used and it will show for a long time a damp spot on rainy or sultry days. If the bricks are covered with a good coat of gas tar before plastering they will never stain either paper or white coat.

If the walls are damp from other causes, remove the plastering, brush off the wall with an old broom, give it two good coats of the tar and then replaster over the tar. The dampness will not show through the plaster. The latter will adhere to the tar the same as to the bricks.

From Builder, N. Y.—In regard to the query of "W. W.," Baltimore, Md., I desire to say that his question is confusing. I cannot make out whether he wants to use more brick, or take the plaster off that which he has used. If he wants to treat the mortar that is on the brick it is another question. I cured one such case with Alabastine. In his case he should try coating the stained plaster with two coats of yellow shellac, and then give it two coats of Alabastine. If he has taken off the plaster he should shellac the brick.

Details of a Sewing Cabinet

From H. W. N., Superior, Wis.—I am sending drawings for a sewing cabinet which is somewhat different from any usually seen and it takes well here because it is out of the ordinary style. The carpenter often has leisure hours which he can devote to turning out useful articles for the house as well as adding a little to his income. I have made two cabinets such as are here shown and they were well regarded.

Referring to the sketches, Fig. 1 represents the appearance of the finished cabinet with details of

the framing. Fig. 2 is an elevation of the top rail and Fig. 3 of the bottom rail, each being 12½ in. in the clear. The one at the back has a half-inch tenon. Fig. 4 is a view of the drawer end and measures 2½ in. Fig. 5 is a detail of the carved molding which is broken around the veneered top. It is dressed to shape and cut out with a ⅜-in. chisel, making a ⅛ in. V cut. Fig. 6 is a cross-section showing reinforcement of the frame with corner brackets. In Fig. 7 is shown a detail of the drawer, the sides of which are 2½ in. deep and ⅜ in. thick. The corner compartments are 3 x 8 in., the center one at the front 3½ in. by 4½ in. and the dows nearer to the doors and place the upper windows over them; then those over the doors could be made smaller or left out altogether. This arrangement might bring the spaces so as to avoid some of the different sizes of blocks which he mentions.

Another change would be to make a belt course 6 in. high over the lower windows. This would bring the blocks up in line with the upper windows the same as the lower ones.

There could be a belt course over the upper windows or the cornice might be started 6 in. lower. The cornice could have almost any de-

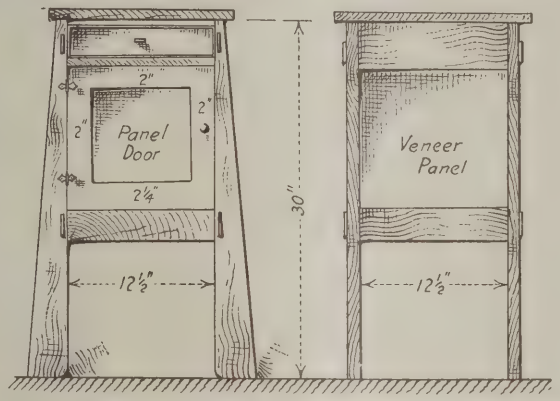


Fig 1—The Sewing Cabinet with a Detail of the Framing





Fig. 2—Elevation of the Top Rail

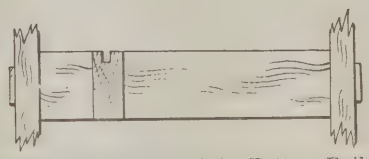


Fig. 3—Elevation of the Bottom Rail

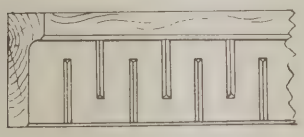


Fig. 5—Detail of Carved Molding

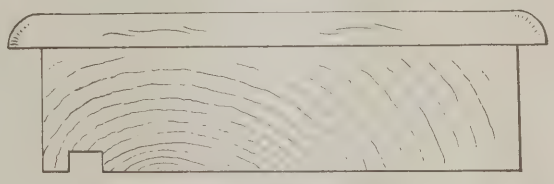


Fig. 4—View of End of Drawer

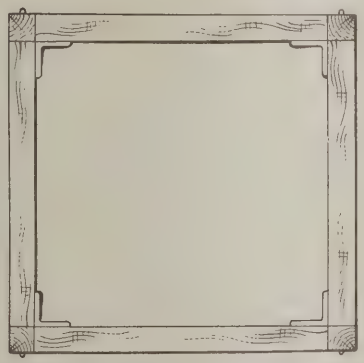


Fig. 6—Cross Section Showing Corner Reinforcement

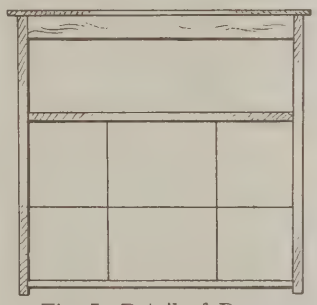


Fig. 7—Detail of Drawer



Fig. 8—The Drawer Pull

Details of a Sewing Cabinet—Contributed by "H. W. N."

one immediately in the rear of it, 3 x 4½ in. In Fig. 8 is shown the drawer pull, ⅞ x 1 x 2 in. carved out of the same material of which the cabinet is made.

Comments on Ten-Room Twin House

From John Upton, La Fargeville, N. Y.—In answer to the correspondent asking for comments on his ten-room twin house, I beg to say that even though the two windows over the doors are not needed it seems well to put them in so as to render the design more symmetrical and avoid weight over the door. He might bring the lower windows nearer to the doors and place the upper windows over them; then those over the doors could be made smaller or left out altogether. This arrangement might bring the spaces so as to avoid some of the different sizes of blocks which he mentions.

Another change would be to make a belt course 6 in. high over the lower windows. This would bring the blocks up in line with the upper windows the same as the lower ones.

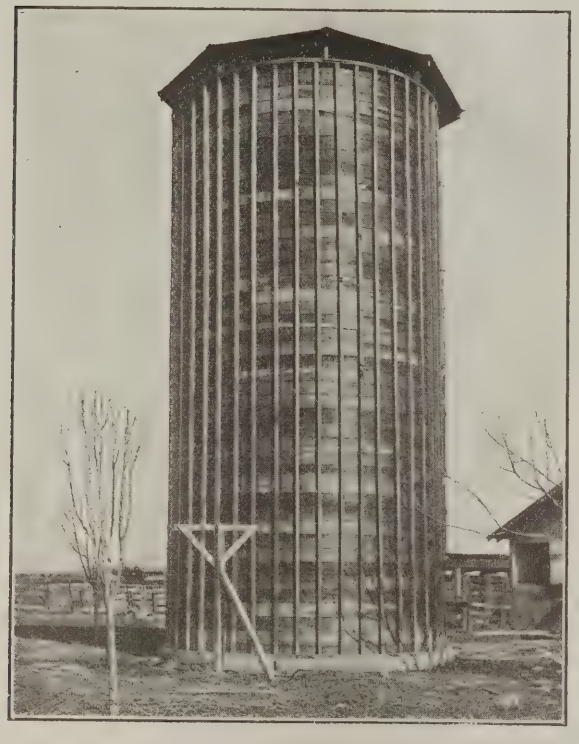
There could be a belt course over the upper windows or the cornice might be started 6 in. lower. The cornice could have almost any desired overhang if rightly constructed. The idea is to corbel it out gradually using moldings for the corbels and plain boards for the vertical parts—ornamented if desired. The ends should be left plain—not returned. Wire should be used here for reinforcement and in the caps over the openings, also in the water table and belt course.

A 100-Ton Silo for $200

From Charles Alma Byers, Los Angeles, Cal.—Some of the readers in the farming sections may be interested in the silo shown herewith and I will, therefore, give a brief description of it. It

has a capacity of about 108 tons, cost a little less than $200, is constructed entirely of wood, except the base, which is of concrete, and was completed within about two weeks from the time it was started. As will be realized from the picture, it is of extremely simple design, and yet it has proved, by one season's use, to be very serviceable and in every other way entirely satisfactory.

The inside measurements of the silo are 14½ ft. in diameter by 32 ft. in height. The concrete base, resting on a foundation of broken stone, is approximately 16 in. thick, and is a circular slab 15½ ft. in diameter. The roof is an octagon, and is shingled over 2 by 3 in. rafters and 1 in. sheathing. The uprights, 40 in number, are also of 2 by 3 in. material, consising of Oregon fir, and the siding is of ½ by 8 in. California redwood. This siding consists of two thicknesses of the same material, with a sheathing of tarred roofing paper



General View of a 100-ton Silo

intervening, and is laid so as to lap all joints and edges on centers, making the silo watertight. The uprights are doved into the circular-cut mud sill, and the latter is securely fastened to the concrete base with anchor bolts. The chute and ladder are naturally constructed of wood also, consisting of 2 by 3 in. framing and 1 in. boards and strips.

Half-inch redwood is easily sprung to create a cylinder, like this silo, and at the same time is very little inclined to check or crack. For an inexpensive and quickly constructed silo, the one here described constitutes a very practical model.

Mixing Paints and Care of Brushes

From D. P. D., Redford, N. Y.—In answer to "R. L.," Wilson, Minn., I may say that too much oil and turpentine injure paint. If the paint runs on a vertical wall, making hairlike cracks, it is too thin. If the lead is good, the surface in good condition and the color gray, then not enough coats are used. When non-drying pigments are used in priming, or non-drying oils are used, then injury follows. Another cause of injury is found in greasy or wet surfaces. Two coats are not enough on new surfaces.

Kerosene is a good cleanser of brushes. Place it in a can and churn the brush forcibly. Beating it against a solid surface will thoroughly clean it. Brushes should be cleaned before laying away.

It is bad practice to paint in a temperature below 40 deg. Fahr., because the walls are apt to be damp and too much turpentine must be used.

From John Upton, La Fargeville, N. Y.—In answer to the query of "R. L.," Wilson, Minn., in regard to the mixing of paints and the care of brushes, I beg to offer the following comments. Making white lead look white does not depend on the manner of mixing, although one should add the oil a little at a time and work the paste over thoroughly. A small quantity of zinc white will make paint whiter.

Brushes can be cleaned by washing in kerosene or turpentine, rubbing on a rough board and wiping with a cloth. They can be kept in oil, kerosene or water, but should be suspended in the liquid and not allowed to rest on the bristles.

Answering the last paragraph of his communication I would say that it is not generally considered good practice to paint when the temperature is near zero, but there may be instances, as in priming new work, where it should be done rather than let it go without. In such cases choose a day when the sun shines and there is some prospect of fair weather.

Keeping a Garage Floor Clean

From S. W. C., Elizabethville, Pa.—Can some of the practical readers of the paper tell us how to cover, treat or replace a board floor of a garage repair room which is located on the second floor? The floor joists have, what seems to us, too long a span, 20 ft., to permit the use of a cement covering. We cannot keep the board floor clean and it makes our insurance high.

Perhaps some of the readers will be able to tell us of a grease-proof, fireproof material we could put on the floor.

To Drive a Nail in Plaster

If you wish to drive a nail in a plastered wall first put it in very hot water until it is thoroughly heated, says the *Woman's Home Companion.* You can then drive it in clean without breaking or chipping any of the surrounding plaster.

"Cold nails will make the plaster fall—
Don't try to drive 'em in.
Just boil your nails—approach the wall,
And hammer 'em like sin!
The plaster will not budge a mite
Though swatted like the dickens—
Hot nails are certainly all right,
Like incubator chickens."

Reinforced concrete construction in the Uuerto Plata district is becoming very popular, being used for almost all new buildings of any size.

Low Cost Cottage of Stucco Finish

Studs Covered with Sheathing Boards and Stucco Applied to Metal Lath—Cost $1200

THE attractive cottage presented herewith represents what may be accomplished by an amateur builder provided he has well defined ideas of the kind of a house that will meet his needs, and the enterprise to carry the work to completion. The owner of this cottage is employed during the day-time in a machine shop, and in carrying out the work of construction there were neither plans nor specifications, as the trade understands them, but all material was bought as required and labor hired by the day. The house contains six rooms and bath, with one of the sleeping rooms located on the main floor.

The foundation walls are of concrete, 12 in. thick, the "forms" having been made of 2 x 4's and sheathing boards, all of which were afterward used in the house. The cellar has a concrete floor and drains to the sewer. At a point 20 in. above the floor the foundation walls recede for a distance of 28 in., thus forming a shelf all around the cellar for the reception of preserves, canned fruit, etc.

The first floor joists are 2 x 10 in. and the second floor joists 2 x 8 in., placed 18 in. on centers. The rafters and studs are 2 x 4 in.

The outside studs are covered with 3-in. tongued and grooved yellow pine boards put on over heavy tar paper and then the stucco was applied, about one year after the house was built. The roof is covered with shingles.

The floors are single throughout, and are of 3-in. tongued and grooved yellow pine. The walls are covered with patent plaster on wood lath.

The interior finish is yellow pine finished in natural grain. The dining room and parlor, or sitting room as some may choose to call it, are stained a golden oak in order to match the furniture.



The Stucco Coated Cottage of R. G. Herrmann at Wapakoneta, Ohio

The stairway is open to the second landing, from which point to the top of the flight the walls each side are plastered.

The way in which the work was done by the owner—R. G. Herrmann of Wapakoneta, Ohio—and his two assistants, is interestingly described by him in a letter from which we quote the following:

"Although I have had previous experience in cement work this is the first job of stucco I ever tackled. The men who assisted me were inexperienced also, but had done a little plastering. We found that by using a wooden hock and wooden

trowel it left a surface rough enough for the next coat without any further roughing. We spread an old piece of linoleum on the ground to catch the material that fell, and thus effected a considerable saving. The hock used was about 12 x 12 x ⅞ in. with a handle nailed to it, and this was used in applying the material to the lath, except in the case of the edges near the trim and windows and doors where the wooden trowel was used. The latter was made of 4 x 8 x ½ in. board.

"The insides of the porch posts were finished smooth with a steel trowel; this being done so that I could screen the porch and fit to the posts. The posts and corners were squared by holding a strip of wood against the corners until the material was put on and then we allowed the strips to stick awhile until the cement had turned hard. We had no trouble with corners breaking.

"We put on the first coat one day, then sprinkled it that night and the next morning, and then we put on the second coat. The next day we put on the brush coat, this arrangement giving the cement plenty of time to take a good hold, and also give a good bonding quality. The work was thoroughly sprinkled night and morning every day for a week. It is as hard as a rock and no cracks have appeared.

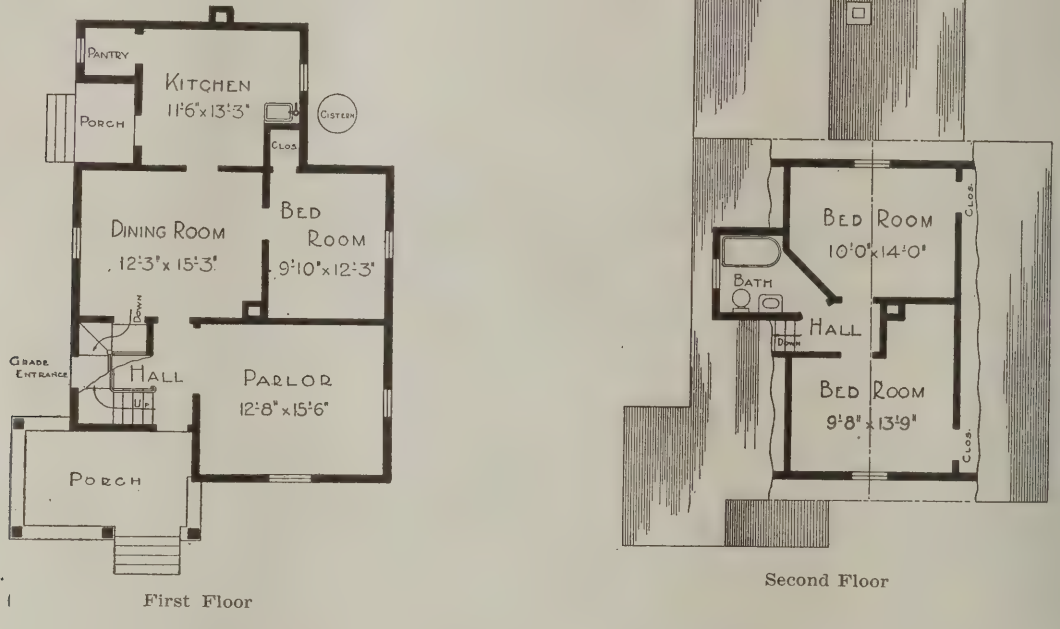
"On May 5, 1913, I bought ten barrels of Medusa white waterproofed cement, but was unable to make use of it until the fall of 1915. The house shown in the picture was of frame construction with tongued and grooved weather boarding on it when it came into my possession. I gave it a good coat of paint, then covered it with cup expanded steel lath, to which I applied Medusa white waterproofed cement and Tuckahoe white crushed marble. The mixture was of the following proportions:

"The first coat consisted of one part Medusa white waterproofed cement and four parts Tuckahoe white marble; the second coat, one part white waterproofed cement and two parts Tuckahoe marble, while the third coat was of the same proportions as the second. The three coats made an average thickness of 1 in.

"The last of the stucco was put on about the middle of September, 1915. I kept the cement in the house in a dark corner and covered it with a dark cloth until I was able to use it. Some of it caked a little, but was readily pulverized by alternately picking up the bag and dropping it on the floor.

"The labor cost of putting on the lath and stucco —two men at $2 per day each—was $42.80. It took nearly 200 sq. yd. of lath—to cover the building, so that the total cost of labor was very reasonable, in fact only a trifle over 21c. per square yard for putting on the lath and three coats of stucco.

"The house has electric lights in all rooms, also gas and city water. It can be built for $1,200; is sufficiently roomy for a small family, looks well and is easy to keep warm. My house is the first job of the kind in this town and has been attracting considerable attention."



A Low Cost Cottage of Stucco Finish—Floor Plans—Scale 1/16 in. to the Foot

Hardness of Various Hardwoods

A recent bulletin of the Northern Hemlock and Hardwood Manufacturers' Association contained a table of the relative hardness of various hardwoods. Hardness is figured on the number of pounds required to imbed a steel ball .444 in. diameter, one-half its diameter into the side of the wood. The figures follow: Walnut—black, 900; maple—hard, 882; beech, 824; birch—yellow, 795; mahogany, 762; cherry, 664; maple—red, 613; sycamore, 609; maple—silver, 592; gum—red, 577; poplar—yellow, 388.

Oakland Building Law Revision

Following the recent agitation in Oakland, Cal., the city council has appointed an advisory committee of fourteen members of the Chamber of Commerce to revise the city building ordinance and outline a substitute designed to remove objectionable restrictions. The committee includes a number of well-known architects and engineers, as well as real estate and business men.

A Gas Dome for Indirect Lighting

Details of a Lighting Fixture for the Home Which Will Be Found Both Timely and Practical

By John Wavrek, Jr.

ONE of the many features of the modern home equipment which is subject to more or less frequent change is the manner of lighting the principal rooms. The beautiful, or at least what we have fondly believed to be beautiful, gas and electric domes of a few years ago are now supplanted to a large extent by the still more attractive indirect system of lighting. This indirect light is certainly restful to the eyes, eliminating as it does the glaring, direct rays of the brilliant gas or electric light; and the average mechanic may, with the aid of a little ingenuity, transform his ordinary means of illumination so that he may enjoy the luxury of owning an up-to-date indirect lamp.

In the description which follows I have endeavored to explain how this may be done with little expense to the wide-awake mechanic. Referring to the accompanying sketches, Fig. 1 represents a sectional elevation of the scheme. The original gas fixture is left as it was installed, and was only disturbed when the dome was put into place. This necessitated the removal of the fixture from the gas pipe and screwing it on again when the dome was in place. The original fixture serves to keep the dome in position by means of the cross-piece, as indicated in the sketch.

Fig. 2 is a general view of the light when completed but not put in place. Fig. 3 represents a plan of the wooden ring which holds the globe and which in turn is held in position by means of the ornamental metal scrolls, as shown in the section.

Fig. 4 is an enlarged view of one of the brackets, of which there are four used in the present case. In most instances there are three supports, but owing to certain conditions the writer used four.

In case four supports are desired, procure from some gas-fixture concern a canopy similar to the one shown in Figs. 1 and 2. If, however, three supports are preferred, then a round canopy should be used. I would state, for the information of the uninitiated, that the canopy is the metal piece at the ceiling to which the hanging pieces are fastened. Next secure the metal pieces from which to make the supporting scrolls. These may be of iron or brass, but in my own case iron was used. These pieces are ½ x ¾ in. and of sufficient length to make the scrolls, which may be of more simple design than those shown if desired.

A glass bowl of any desired size can also be obtained in a gas-fixture establishment. The bowl shown in the sketch is 12 in. at the neck. Having determined the size of the bowl, we then lay out the wooden ring, which consists of three sections, as shown in Fig. 3, each section being made in four quarters. The joints of the section next to the upper one are made to go midway between the brackets, passing through the notch in the bracket. The other two members of the ring are fitted between the brackets, this method producing a very rigid piece of work.

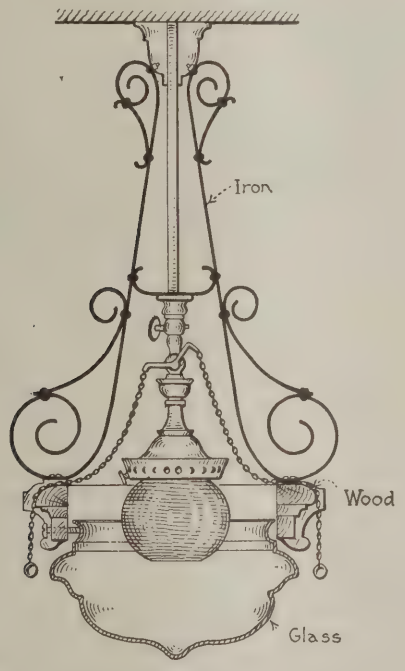


Fig. 1—Section on Line A-B of the Plan Fig. 3

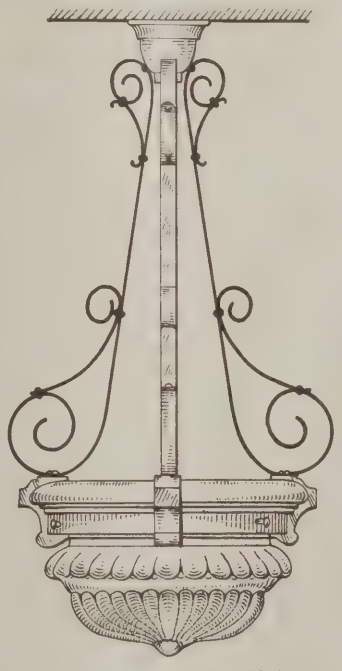


Fig. 2—Elevation of the Fixture

A Gas Dome for Indirect Lighting Showing Some Details of Construction

Having now completed the wooden portion, it is necessary to bore three holes in the lower member of a size to allow a quarter-inch bolt to be placed therein. The hole should be made small enough to allow the threads of the bolt to be cut, which is accomplished with the bolt screwed in. These three bolts support the bowl, as shown.

Having constructed the different parts, the whole may then be assembled. The metal scrolls are fastened to the canopy by means of small bolts and are screwed onto the brackets of the wooden ring with good strong round-head wood screws.

At this stage the gas fixture is taken off, the dome pushed up into position and, if everything has been carefully measured, it is simply necessary to replace the gas fixture, which will serve to hold the whole thing in place by means of the cross-piece above referred to and as shown in Fig. 1. In order to make the job doubly secure there is a small set-screw placed in the neck of the canopy, and this also aids in holding the light in position.

The chains controlling the lighting of the gas mantle are passed over the rim of the wooden portion and allowed to hang down far enough to be

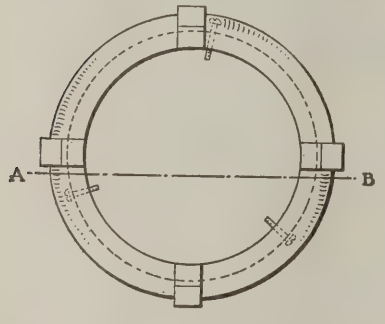


Fig. 3—Plan of Wooden Ring



Fig. 4—Detail of the Bracket

Gas Dome for Indirect Lighting

within easy reach of a person standing on the floor. After putting the bowl into place the indirect gas dome will be ready to do its work, and we have not the slightest hesitation in asserting that it will be found of great benefit by reason of the restful mellowness of the light.

Another New York Skyscraper

Another change has been made in the plans for the new building of the American Express Company, and the structure which it is now intended to erect will have a frontage on Broadway of about 80 ft., a depth of 210 ft., a frontage on Trinity place of 76 ft., and a height of 21 stories, instead of 32 as originally designed.

The lower part of the structure will be arranged in the same manner as a bank, the grade floor being equivalent to two stories with large bays, the central one of which will form the entrance to the building and be trimmed with marble and bronze. The first three stories will be of granite, the middle fifteen of glazed face brick trimmed with limestone sills, the upper three stories and balustrade will be of terra cotta with an archway serving to connect the two top floors.

The estimated cost of the structure is placed by the architects, Renwick, Aspinwall & Tucker, at $2,500,000. The construction work is being done by Cauldwell-Wingate Company, New York City.

A Sound-Proof Building

What is said to be the first sound-proof building of its kind in this country if not in the world has lately been constructed at Evanston, a suburb of Chicago, Ill. Sound-proof floors, partitions and ceilings, forced warm-air ventilation, and hermetically sealed doors and windows, are features of the unique music practice building for the students of the School of Music of the Northwestern University.

The structure houses twenty-eight diminutive rooms, each measuring 6 x 9 ft., with ceilings 9 ft. high. The rooms are eminently usable for music practice; their practicability, however, is only by reason of the peculiar construction of the doors—a patented invention, says the *Scientific American*—which prevents the transmission of sound from room to room, supplemented, of course, by sound-proof partition walls.

Size of Rooms Required

In the existing music practice building of the school it had been found that a sufficient remoteness of one piano from another to furnish even a poor protection from the sound of a neighboring piano required rooms of at least 130 sq. ft. of floor space. Comparing the latter figure with the 54 sq. ft. of the rooms in the new building, the saving in building costs is at once apparent, while the sound-transmission is reduced to a minimum.

Four different methods of sound-proofing the partition walls have been adopted in different sections of the present music practice building, in order to learn their respective worth for future use in a larger music building which, it is hoped by the school authorities, may be built in the future.

No lath or plaster appears in the building except in that section of the structure where gypsum blocks have been used, in which case a thin coat of plaster was applied merely to give the blocks a smooth surface. Otherwise, 1-in. yellow pine sheathing has been used, covered with canvas; the latter in some instances is glued to the wall, and in others merely hung taut in the manner of tapestried walls.

The windows of the building are double; the inside window is hermetically sealed, while the outside one is hinged outwardly for convenience in cleaning. At a distance of 25 ft. from the building it is said that the twenty-eight pianos when in use can hardly be heard, thus amply protecting the neighboring property from sound-intrusion.

The Ventilation

Ventilation is effected by introducing air from out of doors at a point near the roof. It passes through a duct to the basement, through heating coils, through a spray, and thence by long individual pipes to the top of the wall in each room.

A vent in the baseboard leads the air by an individual pipe to the attic, where it escapes through a roof ventilator. The individual piping system prevents intercommunication of sounds between rooms.

The entrance halls and corridors are heated directly by steam radiators, but the practice rooms receive all their heat, air and moisture through the ventilating system.

The music practice building is of mottled red brick, shingled roof, and is two stories in height,

occupying a ground space of 28 x 59 ft. The interior woodwork is of birch in the natural color, the walls being covered with buff grey canvas.

The doors simulate the so-called sanitary flush doors, two of that kind ⅞ in. thick being fastened together by means externally invisible with a ⅞-in. space between, the space in part occupied by sound-deadening felt and in part by the hermetical sealing mechanism. The doors are so constructed that a downward push of the handle closes forcibly the space between door and threshold, while the outer end of a finger, engaging with a cam, pushes the the door unfailingly and forcibly against felt-mounted stop mouldings at the top and free edge of the door; in a word, the door when closed practically makes the wall a continuous one.

One-fourth of the basement only is excavated for heating and ventilating machinery. The steam supply comes from the general heating plant of the university.

Materials for Roofs of Different Pitch

In discussing the question of the various materials which are best adapted to different pitches of roofs a writer in a recent issue of *Contract Record* says: "It is extremely important that a roof material be adapted to the pitch of the roof. There is a certain limitation in this regard to the use of all roof coverings. Thus, roofs of slate, tile, unsoldered tin, etc., are used only on sloped roofs, whereas gravel and tar are applicable to flat roofs exclusively.

"If the pitch and the material are not properly related, leaky roofs are sure to result. The following table gives the desirable slopes that may be safely used with the roofs mentioned:"

Material	Rise of roof per ft.
Wooden shingles	6 in.
Slates	6 in.
Tiles	4 in. to 7 in.
Corrugated iron	4 in.
Asbestos shingles	3 in.
Tin plate	1 in.
Concrete	Flat
Tar and gravel	½ in.
Asphalt	½ in.
Ready roofing	1 in.

Casualties from Slipping and Tripping

Of vital interest to architects, builders and others concerned with the construction or maintenance of buildings is an address delivered by H. W. Mowery, safety engineer of New York City, at a meeting of the Philadelphia local of the National Safety Council, held recently at Franklin Institute. Through records from industrial commissions of four States and the coroner's office of New York City, he showed that an amazing number of casualties and an enormous cost for compensation, hospital and medical expenses, etc., are chargeable to the use of unsafe surfaces on which people walk or work. As the types of materials used are determined largely by the architect and the engineer, they can and should co-operate in the effort to eliminate many of the unsafe material conditions which permit these needless casualties and expenses.

He pointed out that more casualties than from any other public industrial hazard are caused by slipping and tripping and yet less effort has been directed toward the elimination of this type of hazard than has been given to each of several others, which, combined, are less productive of casualties.

In the four years just passed there were 625 recorded fatalities in Manhattan from slipping and tripping. In 1914 and 1915 there was from this source a total of 298, while there were only 283 from elevators, fire and surface cars combined. The causes of slipping and tripping are unsafe material conditions.

In a certain large New York office building there was an average of nearly four accidents a week for a long period, caused while people were getting on and off elevator cars. Finally, the superintendent of the building installed at all floor landings a strip of anti-slip material about 8 in. wide along the entire bank of elevators. Since then there has not been a single fall reported.

On the main stairway of a railroad terminal there were twenty-one accidents in six weeks. Observations showed that people descending the stairs would slip on the metal nosing, the feet sliding forward and the front of the heel catching in one of the grooves throwing the person forward frequently striking upon the head. The treads were replaced by another type having anti-slip nosing and no heel-catching grooves. In the following three months not a single fall was reported.

Rigid Inspection Necessary

During actual construction rigid inspection should be made to provide for safe material conditions as well as the quality of workmanship and material entering into the project. It is much easier and more economical to remedy unsafe conditions as they are discovered than after the structure is completed. Moreover operating conditions during construction may be made more safe. Broken and uneven sidewalks, scaffolding and walk-ways in the work itself, also material dangerously piled, should not be permitted.

In New York State the Labor Law requires that in all factories over one-story in height "the stair treads shall be so constructed and maintained that persons walking thereon shall not slip." Within the past few months the same provision has been embodied in the New York City building code, and on Feb. 1 of the present year Pennsylvania adopted an amendment in regard to foundries to the effect that "all passageways and stairways, inclined runways, charging decks and platforms shall be properly lighted and shall have tread surfaces so constructed and maintained that persons walking thereon shall not slip or trip." The National Fire Protection Association has embodied the same provision in its specifications for standard buildings.

Other important bodies are awakening to the urgency of insisting that slippery surfaces shall be eliminated and that instead of slippery stone, glass, cement and especially iron and steel there shall be used some effective anti-slip material.

Each year the city of Buenos Aires gives a cash prize to the architect of what is adjudged to be the handsomest building erected during the year and the owner receives a worth-while tax exemption.

Outing of Chicago Builders' Club

An Annual Affair Which Is Greatly Enjoyed by the Members of the Club



SECRETARY TOM MANEY

ESTIMATE sheets and business worries were gently but firmly placed aside on Tuesday, July 11, by members of the Builders' Club of Chicago when they journeyed to Cedar Lake, Ind., for their twenty-first annual outing. The day was one that will be remembered for many months to come, as especially fine weather contributed much to the day's festivities.

It was shortly before nine o'clock in the morning that the members gathered in the club rooms, in the Chamber of Commerce Building, and told stories prior to the start for the Hoosier resort. It was ten o'clock before the automobiles were self-started, each gaily bedecked with purple and white bunting, and pennants flying on either side of the wind shield. President James A. Green's car led the way south, down Michigan Avenue, and Chicago was soon left behind, though the breeze from Lake Michigan was present for the first hour. Human beings, like automobiles, need internal lubrication, so it was decided to make the first stop en route the Hammond Beach Inn, at Hammond, Ind. The members' mechanism also received satisfactory treatment at the State Line Inn, from which point the trip was continued without stop.

Binyon's Resort, at Cedar Lake, was reached shortly after one o'clock, when a quick retirement to the washroom was made by the dusty travelers. After a leisurely clean-up, the dinner bell was anxiously awaited, and, when it sounded, the members filed into the dining room at 1.30. The specialty of the day was a chicken dinner, for which this resort is justly famous, and everybody did justice to a spread that would be hard to duplicate. Liquid refreshments were served during the meal, and, after coffee and cigars had been enjoyed, the members retired to the shady spots under the trees and told stories. Some of the pictures presented herewith indicate the surroundings under which the tales were recounted.



Group View of Members taken on Annual Outing of the Builders' Club of Chicago, Ill.

"Take things easy" was the order of the day. Accordingly, card clubs were organized beneath the

trees, and "hearts" and "poker" were indulged in. Among the parties was a congenial foursome in George Warren, Billy Scown, Joe Haigh, and Louis Beigler, the spectators in this region being Secretary Tom Maney, Arthur Nollau, Frank O'Connell, and T. B. Heinemann.



Outing of Chicago Builders' Club—A Group of Past Presidents—Standing, Left to Right—T. Frank O'Connell, Harvey C. Knisley, James A. Green, Louis Binyon, and James A. Hogan—Seated—E. W. Sproul and Charles W. Gindele

President Green also gathered a bunch together, in Harry Knisely, James H. Clark, and Jim Tuttle, and, according to all reports going the rounds, everybody was about even when hostilities were called off.

On the porch of a near-by cottage was the "big" game of the day, the participants being Charley Gindele, Bill McLoughlin, Jim Hogan, Bob Wilson, George Ruehle, and Michael McGovern. Jess, the waiter, was in constant attendance, and his celebrated combination, John E. Walker and H. I. Ball, was received everywhere with approbation.

John McLoughlin, the celebrated ladies' man, could not resist the temptation to take a swim.

The Beau Brummel of the day was George Ruehle, who dashed around in white shoes and hose.

E. H. Peters, of the L. J. Mueller Furnace Co., Milwaukee, Wis., was among those present.

There were numerous members present who are reverently referred to as "old timers," among them being Past Presidents Charles Gindele, T. Frank O'Connell, Harry C. Knisely, Louis Binyon, James A. Hogan, E. W. Sproul, and President James A. Green.

Charles H. Bishop, of THE BUILDING AGE, received the courtesies of the day from Secretary Tom Maney and George Warren.

On the return trip, Arthur Nollau's "Pierce-Arrow" lost its way, which made it necessary for his chauffeur, Frank, to hit the high spots to the extent of 53 miles per hour. The rest of the cars were caught, after a furious drive, near Hammond, where a stop was made before reaching Chicago.

Cost of a Concrete Building

Some very interesting figures on the cost of reinforced concrete buildings were presented in an address recently given before the Real Estate Exchange of Cincinnati by W. P. Anderson, president of the Ferro Concrete Construction Company of that city. While he realized that a good many items included in the cost of such buildings will naturally vary, he took as a basis a plan structure, with no fancy exterior decorations, and included the principal items which go to make up the cost, such as walls, windows, floors, floor finish, stairs, toilets, and plumbing fixtures. The cost of excavation, heating, lighting, and elevators is so dependent upon each particular building that these items were omitted from the estimate.



Resting Under the Trees After Partaking of the Chicken Dinner

The assumed load on the floors is 150 lb. per square foot with column spacing about 18 ft. on centers and story heights about 12 ft. Mr. Anderson estimates the base cost on a building 50 x 50 ft.

as about $1.55 per square foot of floor space. If the building is 50 x 100 ft. this price would be reduced to $1.20. If 50 x 150 ft. it would be $1.12, and if 50 x 200 ft. it would be $1.07.

In all these cases the building is assumed to be from four to ten stories high. A three-story building would cost somewhat more but the difference would be very slight. A two-story building would cost from 10 to 12 per cent more than these figures, and a one-story building from 15 to 20 per cent more.

A decrease in the width of the building would increase the cost so that for a width of 25 ft. instead of 50 ft. the unit cost would be increased from 35 to 45 per cent. If building widths are increased the costs would be correspondingly decreased.

The effect of increasing or decreasing the floor load depends on the height of the building. Obviously, there would be practically no change on a one-story building as the load comes directly on the ground. In a six-story building the decrease in cost for a 75-lb. load would be about 12 cents per square foot of floor space. This figure would also about equal the increase in cost if the live load was doubled.

The effect on the cost of varying the column spacing will not be great. Where columns are spaced about 15 ft. apart the cost will be about 6 per cent greater than where columns are spaced 25 ft. apart both ways.

In giving these estimates of costs for reinforced concrete buildings Mr. Anderson allowed for two stairways and one elevator tower for a building under 150 ft. in length, and two stairways and two elevator towers for greater lengths. Two plumbing fixtures per floor were allowed for the first 5000 sq. ft. and one additional fixture for each additional 5000 sq. ft. No allowance was made for any interior partition work except that which would be necessary around stairs, elevator shafts and toilets. Of course, these estimates are based on plain factory buildings, and any attempt at decoration would naturally increase the cost.

The percentage of window area to wall area would have but little effect on the unit cost of the building. In figuring the estimates given a steel sash window with ordinary glass was used. If wire glass was found necessary the cost would be considerably more than for plain wall.

Bank Building to Be Remodeled

The contract has been let by the Vineland National Bank, Vineland, N. J., for the remodelling of its building to Hoggson Brothers, New York. The remodelled building—a clever adaptation of the Georgian period of architecture—will be constructed of brick, with marble trim and granite base. Four white Vermont marble pilasters, across the front of the edifice, will give evidence to the element of strength characteristic of the banking business. The banking room will be finished in oak and mahogany with a counterscreen of Botticino marble and base of light Bougardt, surmounted by handsome ornamental grilles.

New building ordinances have just been adopted by the towns of Sanger, Cal., and Mesa, Ariz.

Tenement House Construction in New Jersey

Figures have just been issued by the Board of Tenement House Supervision of New Jersey covering the number of plans of new buildings approved during the first six months of this year, also those for the corresponding period of 1915. The total for the six months just ended shows 404 new buildings to have been approved, estimated to cost $5,808,000, while in the first six months of last year plans for 418 buildings were approved, estimated to cost $5,290,000. The alterations were $164,500 in the former case, and $164,500 in the latter case, this bringing the two totals to $5,972,500 and $5,455,700 respectively.

	Jan. 1 to June 30, 1915		Jan. 1 to June 30, 1916	
Municipalities	No. Bldgs.	Cost, Estimated	No. Bldgs.	Cost, Estimated
Arlington	1	$ 6,000	1	$ 7,000
Atlantic City	6	106,000	12	294,000
Bayonne	8	110,000	24	250,000
Belleville	1	10,000	5	43,000
Bloomfield	2	10,000	2	8,000
Bound Brook	1	8,000	1	8,000
Cliffside Park	1	9,000	1	15,000
Clifton	4	23,000	4	41,000
Dunellen	..	.....	1	6,000
East Orange	18	309,000	15	310,000
East Rutherford	1	12,000	..	.....
Edgewater	1	30,000	1	28,000
Elizabeth	5	29,000	10	67,000
Englewood	1	13,000	..	.....
Garfield	4	25,000	10	57,000
Grantwood	1	10,000	..	.....
Guttenberg	2	18,000	..	.....
Hackensack	..	.....	1	25,000
Haddon Heights	..	.....	1	15,000
Harrison	4	24,000	3	19,000
Hoboken	..	.....	1	18,000
Irvington	10	58,000	26	171,000
Jersey City	118	1,530,000	88	1,448,000
Kearny	6	52,000	2	11,000
Lakewood	..	.....	1	20,000
Lodi	2	12,000	..	.....
Montclair	9	177,000	..	.....
Morristown	..	.....	1	25,000
Newark	104	1,204,000	47	759,000
New Durham	..	.....	1	9,000
North Arlington	1	16,000	..	.....
North Bergen	8	147,000	3	24,000
North Plainfield	..	.....	1	12,000
Nutley	3	28,000	..	.....
Ocean City	1	17,000	1	8,000
Orange	4	48,000	16	159,000
Passaic	10	106,000	18	208,000
Paterson	14	134,000	15	94,000
Perth Amboy	1	7,000	5	81,000
Phillipsburg	1	22,000	2	38,000
Plainfield	1	45,000	..	.....
Pleasantville	1	18,000	..	.....
Pompton Lakes	..	.....	1	7,000
Raritan	..	.....	1	5,000
Roselle Borough	1	11,000	..	.....
Roselle Park	1	7,000	..	.....
Rutherford	..	.....	1	7,000
Shadyside	1	6,000	..	.....
South Orange	1	50,000	..	.....
South River	..	.....	1	5,000
Summit	3	11,000	2	12,000
Town of Union	8	158,000	2	68,000
Trenton	..	.....	2	26,000
Wallington	1	5,000	..	.....
Weehawken	..	.....	9	140,000
West Hoboken	10	106,000	10	212,000
West New York	30	486,000	49	1,000,000
West Orange	6	68,000	4	24,000
Woodcliff	1	9,000	2	24,000
Total	418	$5,290,000	404	$5,808,000
Alterations	157	165,700	145	164,500
Total	575	$5,455,700	549	$5,972,500

As might naturally be supposed, the greatest number of plans were for new buildings in Jersey City, but while the falling off in plans filed in the first six months of 1916 was appreciable as compared with the corresponding period last year there was less than $100,000 difference in the cost in the two periods. Newark also showed a heavy falling off, both in the number of plans approved and the estimated cost of improvements. On the other hand, Atlantic City, Bayonne, Orange and Passaic showed appreciable gains over the first half of last year.

It is stated that Virginia, in 1612, produced the first bricks made in the United States.

A Unique Architectural Scheme in Building Construction

A rather unique architectural scheme is nearing completion in the business section of Lake Forest, Chicago, involving as it does, the erection behind a curtain of old business fronts, a number of stores which in their general scheme are an adaptation from old English and German towns. One structure known as the West Building is typically Italian in its architecture.

The buildings directly west of the Chicago & Northwestern railroad station, are grouped about a court, through the middle of which runs a park dedicated to the city. At the entrance to the park will be an ornamental stone fountain. At the opposite end is the white colonnade of the West building, while on either side are the lines of symmetrical brick and stucco store buildings, a general view of which during the progress of the work is shown herewith.

The outstanding feature of the group is the two towers, following the style of the old towers of Munich and Nuremberg. The sun dial tower, forming a part of the north building, rises to a height of 90 ft. while the clock tower opposite it, in the south building, is 70 ft. high.

There are twenty-eight stores in this block, the interiors of which are in harmony with the architectural treatment of the exteriors. In connection with the project it is interesting to note that Berger's "Classik" Steel Ceilings were used in all the stores.



Photo. Courtesy Chicago Daily News

Court of New Building in Lake Forest, Ill., Near Completion Behind the Old Business Section Which is Being Razed

New Rule for Garages in Private Houses in Louisville

Under a rule recently issued by William J. O'Sullivan, Building Inspector of Louisville, Ky., no permits will be issued for residences with garages in the basement unless the plans contemplate making the garage absolutely fireproof, with but one entrance, and that from the outside. Under the rule the department has already required changes in the plans of five dwellings to make the garages proposed for the basement conform with the new requirement.

Before issuing the rule Mr. O'Sullivan determined the character of the regulations in the matter of garages under inhabited buildings in twelve other cities. In but two instances, St. Louis and Cincinnati, did the replies indicate that there were no restrictions of any kind on this subject. A majority of the remaining cities made the entrance the only opening in the fireproof room, while the other permitted the construction of a fireproof door leading into other parts of the house. Because of the danger of this door being left open and thus destroying the precaution against fire found in the fireproof construction, Mr. O'Sullivan decided upon the more stringent requirement as the safest.

Six Months Building in Manhattan, New York

The figures covering building operations in the Borough of Manhattan, New York City, for the first six months of the current year, show that new construction work has been planned upon a scale far in excess of that for the corresponding period of 1915. Most of this increase is due to the pronounced activity in the second quarter of the year when the building season was in full swing. The totals compiled by the Superintendent of the Bureau of Buildings, showing the various classes of buildings projected, constitute some striking contrasts with last year. In the case of tenement house construction, permits were issued in the first six months of this year covering 116 buildings estimated to cost $18,464,000, while in the same period last year, permits were taken out for 98 buildings involving an outlay of $9,982,500. Another item showing a heavy increase this year is that of hotels on which plans were filed for 14, estimated to cost $15,827,000 as against 5 hotels costing $1,128,000 in the first half of 1915. Of office buildings, permits were taken out for 20 this year, estimated to cost $4,125,500, as against 11

in the first half of last year involving an estimated expenditure of $3,625,000. While private houses are not being built at the present time to the extent they were many years ago, 18 were planned in the first half of the current year estimated to cost $1,343,200, while in the same period last year, only 5 were planned estimated to cost $405,000.

The falling-off in the amount of capital put into store and loft buildings, which was greatly overdone a year or two ago, is strikingly shown in the figures for the two periods under review. In the first six months of 1916, plans were filed for 36 such buildings estimated to cost $3,527,000, while in the first six months of last year, plans were filed for 45 such buildings involving an estimated outlay of $10,473,500.

In the first half of the present year, 16 places of amusement were planned, estimated to cost $1,824,500, while in the corresponding period last year, 15 such buildings were planned to cost $960,250. There were two hospitals planned this year to cost $1,000,000 as against five a year ago to cost $560,000.

The estimated cost of the new buildings projected in Manhattan during the first six months of 1916 is placed at $52,363,895 with alterations costing $10,647,335, making a total of $63,011,230. In the first half of 1915 the new buildings for which permits were issued were estimated to cost $39,638,720 and alterations costing $5,082,290, or a total of $44,721,010.

Chicago's Mammoth Recreation Pier

The municipal recreation pier now rapidly approaching completion on the waterfront in Chicago, Ill., may justly be classed as one of the Seven Wonders of the World. Although the pier is built largely of concrete and steel, millions of feet of lumber were used in its construction. Doubtless few people, excepting those directly concerned, have had any idea of the enormous quantities of material of all kinds used, of not only lumber, but of the other component materials.

The pier is 3,000 feet long, extending out into the lake directly east from the foot of Grand Avenue and just north of the mouth of the Chicago river. It is particularly easy of access to the general public owing to the fact that any north and south line of street cars will transfer to the Grand Avenue Lake Shore line, which runs through the interior of the structure to within about 700 feet of the lake end. It travels on the second floor of the pier, turning at the east end and having ample accommodations all the way around the interior loop, about 5,000 feet in length, for receiving and discharging passengers.

Quantities of lumber used were:

	Feet
Board walk (Douglas fir)	250,000
Sheet piling (Douglas fir)	4,500,000
Bumper plank, freight dock (oak)	25,000
Concrete forms (yellow pine)	1,800,000
Creosoted blocks (yellow pine)	1,350,000
Planking, trestles, etc. (sundry woods)	50,000
Hardwood flooring (maple)	26,000
Total	8,001,000

In addition there were 23,000 pieces of piling, 40 to 60 feet long, which, if reduced to board feet, would make at least 6,500,000 feet more.

The Reconstructed City

The above is the name of an exposition now being held in Paris for the purpose of teaching, even at this early date, how to rebuild war-wrecked portions of northern France, when the appalling conflict now in progress is ended. It is a French exposition entirely and America's part has been only in the sending by lumber manufacturers of an exhibit showing the possibilities of American timber in this work of reconstruction.

"The Reconstructed City" is in several sections, some of which are devoted to city residence construction, city industrial buildings, city planning, rural work, etc. In some cases the city planning department will work for an entire reconstruction on altogether new lines of the cities which have been wrecked by bombardment. In other cases only building construction along the old streets will be required.

The Southern Pine Association, through its European agent, has an exhibit not only of southern building types but of typically American structural work. The American lumber men have a series of models for buildings for city and farm, including a small "mill-construction" building for industrial purposes, and models of farm building, such as an ideal barn, poultry house, granary and piggery. Photographs of groups of these buildings are included and the balance of the exhibit is made up of samples of Southern Pine in various stages from the original timber to the finished lumber. One of the unique features of the exhibit is a relief plan of an ideal farm with model buildings properly placed and landscape effect with hills in relief, streams, roads, etc.

Shortage of Timber in Holland

At a meeting in Amsterdam of an association of employers and workmen in the building industry, gloomy reports were made regarding the supply of timber for building purposes, says United States Consul Frank W. Mahin, writing from that city. Holland has more woodlands than most foreigners suppose, but they are far from sufficient to supply the needs of the country for building timber, and without imports from other countries few houses could be built in the Netherlands.

In the opinion of the association of builders the situation is serious. Timber is now imported from Germany, Sweden and Norway. The quantity obtainable is small, and most of it is of inferior quality. Continued supplies from Germany can not be relied upon, the association believes, as the German Government has need of the surplus timber and will pay a higher price than this country has paid.

The building association gives warning that unless relief measures are taken the supply of wood most needed for construction work will be exhausted within a few months and great stagnation and unemployment in the building trades may be expected. Already several woodworking factories have ceased operations.

This situation suggests that American manufacturers and exporters of building materials might profitably give renewed attention to the Dutch market, with a view to both the present and the future.

New Publications

Indication in Architectural Design. By David Varon. 150 pages, size 9 x 12 in. Illustrated by freehand pencil sketches. Bound in cloth. Published by The Wm. T. Comstock Co. Price $5.00.

One of the most valuable mediums of instruction in architectural schools is the clever pencil of the professor of design, and the author of the work under review has taken advantage of this fact to compile a book which is in reality a course in architectural elements and composition introduced through the medium of freehand pencil sketching. This method tends to develop a sense of proportion and provide a fund of ideas which tend to make the architect thoroughly capable of thinking in three dimensions and increase his power of visualization, the lack of which is a common fault in architectural designing.

The author has not prepared his material with the idea of making it a copy book, but to show the student the steps by which an individual technique may be formed; in other words, how to develop original thoughts and conceptions which shall be of artistic value. To aid in this a simple console is taken, for instance, and shown in a number of different forms, all with the original fundamental idea. The author's training at the *Diplômé Ecole des Beau-Arts* and as Professor of Architectural Design at Syracuse University and at the University of Illinois has well fitted him to contribute valuable ideas along these lines.

The book has a preliminary section of 48 pages devoted to "Analysis of Simple Elements—Training the Eye and Hand," "Analysis by Sketching," "Silhouettes," "Indicating," or the art of picturing ideas by a few simple strokes of the pencil; "The Application of Indicating to Research Work and Analysis," "Elementary Elevation Design," "Design of Elevations Involving Salient Features," "Planning," "Solving a Problem." The rest of the book contains fifty full-page plates with explanatory notes along the lines suggested by the chapter headings.

Estimates, Cost and Profits. By F. N. Vanderwalker. 120 pages, size 5½ x 7½ in. Bound in cloth. Published by Text Book Co. Price $1.

Efficiency is the slogan of the business world of to-day and nowhere is it of greater importance than in the field of estimating. Almost every job done requires an estimate, and the book under review contains valuable information regarding the proper method of preparing estimates for house painting and interior decorating. The author is head of the Paint Information Bureau of Carter White Lead Co. and has, therefore, had opportunities to become acquainted with all classes of work along these lines. The book contains a halftone engraving of an average house, and from this illustration the reader is shown how to estimate area, labor and materials. Next, a set of blueprints of a bungalow forms the foundation for an estimate prepared directly from them. As the author takes up the different features of the work, his comments on estimating according to the finish or color are instructive and illuminating. There are separate chapters explaining important parts of the work to be done.

But not all the profits of a business disappear through incorrect estimates. Many a dollar is wasted in the shop by lack of system and unless a high percentage is added to each job for overhead expense the contractor is ever apt to lose money, and if the percentage is added the estimate is likely to be pretty high. Therefore the chapter on "The Modern Paint Shop and Its Management," is especially valuable along these lines, for the reader is shown how to keep his overhead cost down as well as how to figure it.

Brick Homes at Low Cost. 30 pages, size 12½ x 9¼. Illustrated by plans, photographs and drawings. Paper covers. Published by Society Advocating Fire Elimination. Price 50 cents.

With the idea in mind of popularizing the construction of low cost brick houses, the Society Advocating Fire Elimination compiled the above mentioned book for a number of manufacturers who supported the face brick exhibit at the First American Complete Building Show, held in Cleveland, Ohio, in February of the current year. The work contains plans and drawings of 10 houses ranging in price from $2,500 to $5,000, together with a two-family house and a bungalow, also a Typical Specification. Bids from three reliable contractors are given for each house, together with the number of brick necessary. The houses were specially designed for construction in brick by George W. Ritchie, for several years architect for the Board of Education, Cleveland, Ohio.

Property Owner Not Responsible for Injuries to Contractor's Workmen

The Supreme Court of the State of California recently held that a property owner is not responsible for injury to a contractor's employee working on his property. This decision virtually invalidates that part of the workmen's compensation act which empowered the State Industrial Accident Commission to enforce compensation claims against a property owner as a "principal" if he let work on his property entirely to a contractor.

As many contractors are financially unable to satisfy judgments in favor of injured workers, and as this holding will be unfair to those contractors who are financially responsible, an effort will be made to appeal or to secure remedial legislation.

New Building Ordinance for San Diego, Cal.

At his own request, Building Inspector J. E. Fifield of San Diego, Cal., has been authorized by the city council to draft a new building ordinance. He will be assisted by a number of architects.

According to official reports just compiled forest fires burned over something less than 300,000 acres of National Forest land in 1915, the timber loss being 156,000,000 board feet valued at $190,000. Although the season was regarded as one of unusual exposure owing to delayed fall rains, the loss was materially below the average for the last five years.

Brief Review of the Building Situation

Building Operations for June in 114 Cities Show an Increase of 30.3 Per Cent Over June, 1915

DURING the month of June, new construction work was projected upon a liberal scale in all sections of the country, the amount of capital involved in 114 cities showing a gain of 30.33 per cent over June, 1915. Of the cities reporting, 86 indicated increased activity, while 28 show a falling off in the value of the improvements for which permits were issued.

In the Eastern section of the country, 42 cities reported an increase of 34.3 per cent over June a year ago, the gain in New York City being especially marked. The unusual increase in the Borough of Manhattan is doubtless due in part, at least, to the action of many builders in forestalling the impending restriction on the heights of buildings, and the contemplated zone measure, both of which are expected to soon become a law, by placing on record plans for large buildings, many of which may not take tangible form for a long time to come. The filing of such plans was particularly noticeable the latter part of the month and during July. The accompanying table shows the changes in Eastern cities in June compared with June, 1915.

CITIES OF EASTERN STATES

	June, 1916	June, 1915
Albany	307,455	359,405
Allentown	165,730	151,780
Bayonne	102,594	32,784
Binghamton	175,123	155,208
Boston	5,634,000	5,628,000
Bridgeport	523,300	779,899
Brockton	256,905	83,257
East Orange	112,398	66,739
Elizabeth	251,464	109,614
Erie	353,989	155,254
Harrisburg	126,155	221,950
Hartford	814,703	462,523
Haverhill	135,500	94,150
Hoboken	16,480	64,140
Holyoke	146,250	93,015
Irvington	68,640	42,755
Jersey City	698,076	519,958
Manchester	137,702	316,917
Newark	1,433,756	770,884
New Bedford	210,925	201.150
New Haven	257,580	451,025
New York:		
Manhattan	18,322,110	4,392,190
Bronx	2,322,278	1,286,041
Brooklyn	4,102,609	4,526,677
Queens	1,346,141	1,744,075
Richmond	523,362	316,781
Passaic	163,520	61,940
Paterson	121,114	313,748
Philadelphia	5,147,115	3,873,850
Pittsburgh	940,762	1,212,472
Quincy	269,139	130,612
Reading	69,750	152,900
Rochester	662,042	969,632
Scranton	228,086	343,491
Schenectady	118,493	91,883
Springfield	898,918	451,538
Syracuse	552,995	414,119
Trenton	286,249	486,267
Troy	55,753	93,475
Utica	129,725	272,400
Wilkes-Barre	117,351	58,111
Worcester	660,152	348,148

In the cities of the Middle West or central portion of the country the gain as compared with a year ago has been quite marked, 35 cities showing an increase of 26.9 per cent. Unusual activity is to be noted in Akron, Chicago, Detroit, Cleveland and Minneapolis.

CITIES IN MIDDLE STATES

	June, 1916	June, 1915
Akron	1,323,455	355,225
Cedar Rapids	291,000	135,000
Canton	336,945	135,670
Chicago	11,050,700	7,613,500
Cincinnati	1,082,580	940,635
Cleveland	2,742,570	2,378,510
Columbus	557,370	410,370
Davenport	115,572	90,008
Des Moines	204,220	150,252
Detroit	4,941,635	2,669,265
Dubuque	45,134	33,650

CITIES IN MIDDLE STATES (Continued)

	June, 1916	June, 1915
Duluth	420,572	398,240
East St. Louis	68,635	98,995
Evansville	115,452	53,717
Ft. Wayne	335,875	173,250
Grand Rapids	470,000	216,908
Indianapolis	779,792	526,299
Kansas City, Mo	974,425	752,245
Kansas City, Kans	117,547	72,531
Lincoln	144,935	137,257
Milwaukee	997,111	829,290
Minneapolis	1,686,835	1,350,535
Omaha	604,900	594,590
Peoria	116,625	178,500
St. Joseph	35,310	74,985
St. Louis	1,215,520	1,465,695
St. Paul	1,206,075	1,169,946
Sioux City	526,250	150,250
South Bend	66,721	91,477
Springfield	95,135	157,225
Superior, Wis	187,120	73,948
Terre Haute	74,415	28,850
Toledo	595,104	762,845
Topeka	37,625	39,065
Youngstown	279,025	433,080

The Southern cities show the smallest gain of any of the four zones into which we have divided the country, the 21 cities reporting indicating an increase over June last year of 11.43) per cent. The cities showing important gains are Baltimore, Charleston, Dallas, Jacksonville, New Orleans, Tulsa, Okla., and Wilmington, Del.

CITIES IN SOUTHERN STATES

	June, 1916	June, 1915
Atlanta	252,776	334,246
Baltimore	669,235	557,979
Birmingham	179,560	240,960
Charleston, S. C.	358,596	263,898
Chattanooga	58,645	61,435
Dallas, Tex	311,440	142,125
Ft. Worth	87,138	52,553
Huntington	76,451	114,480
Jacksonville	213,307	100,830
Louisville	260,145	332,420
Memphis	320,640	285,275
Montgomery	54,245	26,286
New Orleans	614,932	279,731
Oklahoma	113,675	85,327
Savannah	97,050	115,580
San Antonio	109,450	98,325
Tulsa, Okla	240,405	92,000
Tampa	64,320	240,266
Waco, Tex	57,296	121,025
Washington	1,040,487	1,142,482
Wilmington	231,575	105,296

Coming now to the extreme Western section of the country and including cities no farther east than Denver, we find a gain of 35.9 per cent over June a year ago. Increased activity is noted in Los Angeles, Oakland, Portland, Denver, Sacramento. San Francisco and Tacoma, while cities showing a falling off as against a year ago are Seattle, Spokane and Pasadena.

CITIES IN WESTERN STATES

	June, 1916	June, 1915
Berkeley, Cal	254,475	214,650
Colorado Springs	16,583	15,355
Denver	370,250	179,745
Los Angeles	1,037,532	997,240
Oakland	423,193	27,718
Pasadena	103,064	163,839
Portland	983,215	460,095
Sacramento	303,012	94,498
San Diego	98,725	82,578
Salt Lake City	219,650	199,958
San Francisco	2,046,756	891,007
San Jose	77,086	23,370
Seattle	447,390	631,045
Spokane	138.415	240,390
Stockton	60,800	70,611
Tacoma	204,617	56,828

For the first six months of the current year the amount of new construction work planned has been considerably in excess of that for the corresponding period a year ago, and the outlook continues to be of a most encouraging nature.

Current News of Builders' Exchanges

Meetings and Outings of Various Bodies Throughout the Country—Banquet of Los Angeles Exchange

Picnic of the Pittsburgh Builders' Exchange

THE members of the Builders' Exchange of Pittsburgh, Pa., held their annual outing and picnic at "The Pines," on the Perrysville Road, on Thursday, June 29, the day being ideal and the attendance large and enthusiastic.

The feature of the afternoon was a ball game between the Builders and the Dealers in Builders' Supplies. The captain of the former team was John L. Richmond, and the captain of the Supply Dealers was Hugh F. McKnight. The Builders were conspicuous in the use of the bat, and some hard hitting was a feature, the game being won by the Builders by a score of 15 to 4. Home runs were made by John Richmond and Lawrence Ley.

After the ball game there was a tug of war, which also resulted in a victory for the Builders. The Supply Dealers not being satisfied with the first pull, a second was arranged, and this was also won by the Builders.

After the tug of war there were a series of races, including a 100-yd. dash, free for all, a 50-yd. dash for ladies, a sack race, a three-legged race and a fat men's race. There was also an egg and spoon race for ladies.

After the races a delicious supper was served in the spacious dining room at "The Pines," and consisted of fruit cocktails, fried chicken, waffles and maple syrup, mashed potatoes and green peas, salad, ice cream and coffee. After dinner every lady received a box of choice candy and every gentleman a good cigar.

At 9 o'clock there was an elaborate display of fireworks and from that time until 11 o'clock the guests indulged in dancing.

The members of the committee having charge of the affair made it their business to see that every guest had a good time. In addition to the amusements mentioned a number of the guests pitched quoits, others played cards, and others rambled over the large grounds which form an adjunct of "The Pines."

Altogether the picnic of the Builders' Exchange was one of the most enjoyable entertainments ever held by that association. The committee in charge divided the work. W. E. Goldman, chairman, had charge of the arrangements for serving the dinner; A. C. Kahn looked after the refreshments on the grounds; H. B. Lauderbaugh had charge of the music; P. A. Kinley arranged for the fireworks display, and H. H. Gilmore was in charge of the ball game and the various races.

Banquet of Los Angeles Builders' Exchange

Members and their friends of The Builders' Exchange of Los Angeles, Cal., to the number of about 200, filled the banquet hall at the Elks' Club in that city on the evening of June 15, on the occasion of the annual banquet. The new officers were installed with little formality, most of the evening being given to enjoyment of the dinner and after-dinner speeches. L. J. Pozzo, the "contralto contractor," furnished a cabaret entertainment, and led the diners in numerous songs.

M. A. Berne was toastmaster, and the principal speakers were: J. H. Bean, president; Architect John C. Austin, Federal Judge B. F. Bledsoe, Rev. Baker P. Lee, W. H. Booth and S. L. Weaver.

The speech of most trade interest was that of Mr. Bean, who stated that Los Angeles in the past two years had done more building than any city of its size should have done, probably 50 per cent of the buildings being designed by other than certified architects; that many people gave less attention to the construction of their buildings than to the design of a suit of clothes, and that it was becoming urgently necessary for contractors, builders and architects to unite in a campaign of education.

Annual Meeting of Baltimore Exchange

The annual meeting and election of officers of the Builders' Exchange of Baltimore, Md., was held at the Emerson Hotel on Tuesday, June 20. There was a large turnout of members and the occasion was one of unusual interest. The officers chosen to serve for the ensuing year were:

President.....A. J. Dietrich.
First Vice-president.....C. Morgan Marshall.
Second Vice-president.....John Trainor.
Third Vice-president.....William F. Chew.
Treasurer.....S. Frank Bennett.
Secretary.....I. H. Scates.

There were also elected four directors, namely: George R. Bullen, Willard E. Harn, J. J. Kelly, Jr., and H. J. West.

Mr. Dietrich, who succeeded Herbert J. West as president, is a member of the structural iron firm of Dietrich Brothers, one of the leading firms of its kind in that section of the country. The re-election of Mr. Scates as secretary for the tenth term shows the esteem in which he is held by the membership, and his administration during the past nine years has met with an unusual degree of success, resulting in the local organization becoming one of the leading trade bodies of its kind in the country.

After the meeting there was a dinner at which several short talks were made by members, the topics being of interest to members of the organization. The speakers included Secretary I. H. Scates, F. S. Chavannes, W. E. Harn and Joseph P. Tully.

Retiring President West was given a handsome flat silver service as an expression of appreciation of his labors in the interest of the organization, the presentation being made by Joseph P. Tully on behalf of the members of the exchange.

Outing of Detroit Builders' Exchange

According to previously announced program the members and friends of the Builders & Trades' Exchange and the Michigan Society of Architects, Detroit, Mich., enjoyed the joint annual outing of the associations at Put-in Bay, Ohio, on Wednesday, June 28. There were something like six hundred on the trip, which was greatly enjoyed by all present. An orchestra furnished popular music and the dancing floor of the "Put-in-Bay" was crowded most of the time. Another feature of the trip greatly enjoyed was the American Hawaiian Trio, supplied by the George H. Clippert & Brother Brick Company.

The real excitement of the trip was centered in the contest for a five hundred dollar garage. Each adult person on board who held a Builders & Trades' Exchange coupon was entitled to one guess as to the number of nails contained in a glass jar displayed upon a table. The person guessing nearest the actual number of nails contained in the jar by actual count of a committee selected for the purpose was to be awarded the garage in question. There were also ten other prizes

awarded in the test. The winner of the garage, as announced on the return trip, was E. R. Gloetzner.

There was also a contest by the United Fuel & Supply Company. Buttons bearing a number were given out and each bearer was to find two other buttons with the same number as his own. The prize was an electric flashlight to each of the three persons.

The members and their friends arrived at the island a little after noon and immediately had dinner. At 2 o'clock a game of baseball between the Contractors and the Architects was commenced. Only four innings were played, the score standing at that time 11 to 6, in favor of the Contractors. After the ball game some visited the caves, others went sightseeing, and others enjoyed themselves at the dance pavilion. At 5.30 the boat started on its return trip. Music and dancing occupied the evening until the steamer reached the dock.

The Dallas Builders' Exchange

An interesting feature of the exchange program has been the weekly educational meetings. At the gathering at the Elite Café on June 21, Judge W. F. Ramsey, chairman of the Board of Directors of the Dallas Federal Reserve Bank, advised the sixty members who were present to "Give honest work and charge enough to realize a fair profit." The judge pointed out that "competition is the life of trade and mutual co-operation the keynote of success. It is highly important that contractors figure in their contracts an amount to cover overhead expenses. It does a contractor little good to obtain a contract and make no profit on the job."

At another meeting, also held at the Elite Cafe, D. E. Humphry of the Southern Wire & Iron Company, Dallas, made a very interesting address, the subject being "Services Required of Iron Works." He pointed out that the reason there is so much room at the top for iron works which give real service is because of a lack of knowledge of the first principles of service. "The Builders' Exchange," he said, "stands for many principles, both local and national. There is not a material man or a contractor who does not need its services. The exchange has an open door for the new contractor and material man coming among them. The contractors and material men of Dallas and of Texas are not afraid of fair competition. We want industries to come to Texas to stay, and we want all to join the exchange."

Membership Campaign of Flint Exchange

The membership campaign of the Builders & Traders' Exchange of Flint, Mich., which has been in preparation for some weeks, was launched at the bi-monthly meeting held at the end of June. It is hoped that at least 250 members may be added to the roster of the exchange, and when sufficient members have been secured larger quarters will be established. It is also expected that in the course of time a permanent building exposition will be inaugurated, somewhat similar to those which are features of many of the other builders' exchanges throughout the country.

The exchange has decided to co-operate with E. J. Friar, sealer of weights and measures, to have an ordinance passed to control the sale of sand and gravel in the State, so as to insure the purchaser receiving full measure.

Outing of Twin City Builders' Exchanges

The members of the Builders' Exchanges in Minneapolis and St. Paul enjoyed the fourth annual outing of these organizations on July 22 at Wildwood, White Bear Lake, Minnesota's famous picnic resort. A very interesting program had been prepared for the occasion, including a baseball game between members of the St. Paul Builders' Exchange and those of the Minneapolis Exchange; a tug of war and a game of water baseball between representatives of the two organizations. There were running races, tub races and swimming races for men, a spoon and potato race for the ladies and running races for children.

The committee having charge of the outing issued a week or more in advance of the event a striking poster printed in colors and calling attention to the various features which had been provided.

Meeting of Reading Builders' Exchange

At a recent meeting of the Builders' Exchange of Reading, Pa., the feature was an address by former Mayor W. E. Weimer of Lebanon, chairman of the State Building Code Commission. The speaker explained the code drafted by the commission and told of the campaign waged for buildings not to exceed 125 ft. in height, and the success experienced in having the plan adopted in numerous communities.

New York's Board of Standards and Appeals

In connection with the efforts which are being made to simplify building inspection in New York City, Mayor Mitchel on July 11 appointed several members of the new Board of Standards and Appeals, created by the Building Inspection bill passed by the last legislature. Rudolph P. Miller, who resigned as Superintendent of the Bureau of Buildings for the Borough of Manhattan to take part in the revising of the Building Code, has been appointed Chairman of the new Board. Lansing C. Holden, a member of the American Institute of Architects, is appointed to represent the architects; Howard C. Baird, a member of the American Society of Engineers, will represent the structural engineers; William Crawford, President of the Building Trades Employers' Association, will represent the building trades, and Alfred R. Kirkus and Alfred J. Boulton will represent the Brooklyn building trades.

Daniel Sullivan, formerly Secretary of the Bureau of Buildings, has been made Secretary of the new Board, which, it may be remarked in passing, takes the place of the Board of Examiners.

Important Amendment to Tenement House Law

The attention of architects, builders and others interested in tenement property has been called to the fact that the Tenement House Department of New York City is now empowered to issue foundation permits before the approval of the complete plans for the erection of a tenement house.

New Mechanics' Lien Law

Important amendments to the mechanics' lien law of New York have recently been added, which provide a workable method whereby any building operation which gets into difficulties can, by the co-operation of 75 per cent in amount of mechanics' lien creditors, be completed, without interference from other liens, judgments, attachments or other proceedings.

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Solves All Roofing Problems

Investigate the merits of this roofing material. Its claims for your consideration are based on the following facts:

Costs very little.
Is easy and inexpensive to lay.
Makes a neat, smooth, durable surface.
Will not leak, rot, stretch or shrink.
All this is explained in our new illustrated booklet, "Roofing Facts and Figures." Send for a copy.



CON-SER-TEX is a specially woven canvas roofing which is chemically treated to preserve the fibre from mildew and the detrimental action of the oil in paint. It is water-proof, weather-proof, rot-proof and wear-proof. When properly laid it will last as long as the house itself.

Contractors, builders and carpenters in all parts of the United States continually express their satisfaction with this material when used for roofings, porch decks, sleeping balconies and bungalow construction.

It is furnished in such widths and weights as are best suited for various classes of work, thus practically all waste is eliminated.

Economical Serviceable] CON-SER-TEX *Attractive Profitable*

Certainly the above facts are of sufficient interest to justify your immediate request for samples, prices and complete information. Better write today before you forget it.

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Asphalt Shingles

These Beautiful Colors Add *Charm* To The Roof

Rich looking shades of red, green, gray and brown are possible when you roof with Asphalt Shingles. By using them you can give the houses you build as beautiful an appearance as though the cost were a thousand dollars or so greater.

With this roof beauty goes a thorough protection against the elements that is maintained year after year because this roofing *stays young*. It does not dry out or change. It is just as permanent as the unchangeable color of its surfacing of crushed slate or rock products. Water cannot get through a single layer no matter what the conditions. Yet these shingles form a *triple thick* layer that means three fold protection.

We have a book of new ideas on roofing from which you can get many suggestions that will aid you. Write for your copy of "The Roof Distinctive."

Your Customers Will Like Asphalt Shingles Better

There is a strong appeal in Asphalt Shingles that will interest your customers. They will be quick to see the advantages of a roofing that is handsome, leak proof and repairless. You will have a still greater measure of their confidence for having suggested them.

Every standpoint of roofing value is covered by Asphalt Shingles. From every standpoint of yours, too, they are better. You can apply them faster and at less cost for labor.

They are so much better looking that they make the house you build even more attractive than others near it which are covered with a drab-looking, ordinary roof.

Our other new booklet, "Fire Protection," shows some remarkable tests of various roofings. Proves which roofing gives best protection. Copy sent free on request.

Asphalt Shingle Publicity Bureau

854 Marquette Bldg.
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Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Improvement in Morgan Doors

The Morgan Company of Oshkosh, Wis., Chicago, Ill., and Baltimore, Md., makers of Morgan doors and millwork, has just added another important feature in the building of its doors. In place of the old straight dowel it has acquired the right to use the wedge dowel, which is claimed to be the last word in door construction. The dowel locks stiles and rails together with so tight a



Improvement in Morgan Doors—Fig. 1—Showing the Manner in Which the Dowels Are Used

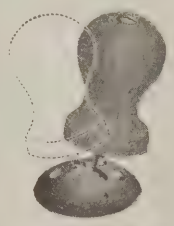
grip that there is not the slightest chance that they can come apart. The fact that Morgan doors are made with an all-white pine core renders them especially suitable for the use of this new device. The wedge dowel is made of hard wood with two oblique slits at each end, as shown in Fig. 1. When the stiles and rails are clamped together the wedge formed by the slits is broken loose and forced back against the dowel, so as to expand the sharp ends, which are, by the pressure of the clamping machine, driven into and embedded in the soft white pine core. The illustration gives an idea of the manner in which the ends of the dowel are forced apart by the wedges and also the spreading that takes place in the sharp ends when they are driven into the core. There are two grooves along the dowel to assure an even spread of glue along the dowel and to prevent any glue or air pockets forming at the end of the dowel. At the conclusion of the clamping operation the holes are filled by the dowel with just enough glue to make a perfect bond between the dowel and the core.

The Double-Surfaced Neponset Shingle

There has recently been placed upon the market by Bird & Son, East Walpole, Mass., a shingle which is said to be an outgrowth of the built-up Neposet twin shingle, but contains features not found in the maker's original shingle. It is known by the name indicated by the above title, and retains the twin shape which is characteristic of all Neponset shingles. The new product is said to consist of a layer of high-grade asphalt felt, which has been thoroughly saturated with asphalt. To the surface of this is added an asphalt coating in the regular way, and into this coating is rolled a solid surface of crushed rock. The next process is the application of a solid coat of asphalt over the rock surface, and then into it is rolled a final surfacing of crushed slate, rather fine in texture and of a high color—red or green. This treatment, it is claimed, results in a very attractive surface and a color that is entirely distinctive. The composition of the shingle is such as to make it extremely flexible, the claim being put forth that it will bend without breaking and will, therefore, lie flat on the roof. It is referred to as being especially adapted for use over a curved hip, or other similar place. By reason of its twin form the shingle can be laid in much less time than that required for ordinary shingles. The new shingle is 20 in. wide instead of 16 1/16, as was the original Neponset, yet it is not too large to prevent its being easily handled by one man. Three nails to a shingle are used, and by reason of the special Neponset cut-out the spacing is automatically taken care of in laying. We understand that a sample of the new shingle may be obtained by any architect or builder upon application to the company.

Iron Bench Planes with Automatic Set

With a view to meeting the demand for a plane which will save the time of the carpenter in setting the cutter and cap, Sargent & Company, 53 Water Street, New Haven, Conn., has just placed on the market a line of iron bench planes, a view of one of which with the knob is shown in Fig. 2. These new planes are made with a single cutter instead of double or spring cap cutter commonly used in connection with iron planes. The most important feature of the new plane is found in the construction of the clamp, which combines the cap and clamp found on the spring cap type of planes. The clamp can be adjusted by means of a regulating screw to whatever point is suitable for the class of work on which the mechanic is using the plane. For a coarse cut he raises the clamp, thus leaving a considerable space between the extreme lower end and the cutting edge, while for a fine cut he reduces this space to a minimum. When the clamp is removed so that the cutter may be ground or honed it will always drop back into its original position without further adjustment, which of course means a considerable saving of time for the



View of the Knob Showing Range of Adjustability

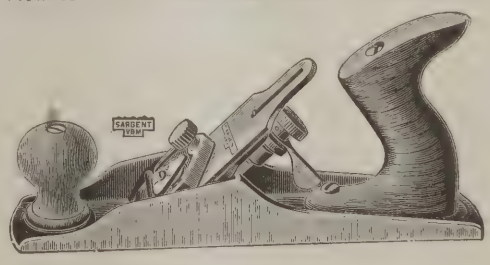


Fig. 2—Sargent's Iron Bench Plane with Automatic "Set"

carpenter. The planes are made in six sizes, namely: Smooth planes, Nos. 707, 708, 710; jack, No. 714; fore, No. 718; jointer, No. 722; the terminal figure indicating the length of the plane. They are made with both smooth bottom and corrugated bottom, the terminal letter "C" being added to the above number to indicate the corrugated.

On the larger sizes, Nos. 718 and 722, there is an

added feature, consisting of a high knob on the front of the plane which is adjustable to permit the user to change his grip on the plane when for any reason he becomes tired after constant use. It also enables the user to swing the knob to the right or to the left to avoid any possible obstruction. These planes are adapted for use on cross-grained hard wood, but the maker states they can be used to equal advantage on soft wood. The fact that they are light in weight makes them particularly convenient for the journeyman carpenter.

A Book on Waterproofing

The Ceresit Waterproofing Co., 110 South Dearborn Street, Chicago, Ill., has issued an interesting 24-page booklet which explains in detail when, how and what waterproofing to use. It is said that every class of construction requires waterproofing in some form, for dampness is a destructive force from which no locality is exempt, no materials escape and no conditions evade. The company manufactures six waterproofing compounds. The first is a plastic paste to be mixed with water used to temper concrete, cement mortar or cement stucco. Ceresitol is a liquid which may be applied with a brush for damp-proofing brick, cement blocks and porous stone of any kind. It leaves no film and does not in any way affect the color of the treated surface. Another product is a permanent damp-proof protective and bonding material to be applied to the interiors of exposed walls before the application of plaster. It eliminates furring and lathing. A heavy, black, asphaltic material is also made for application to outside foundation walls for protection against dampness. A floor hardener is a ground metallic material capable of giving concrete floors a permanent wearing surface and to prevent dusting. This is manufactured in two colors, bluish gray and tile red. The last of these products is an asphaltic paint which may be applied to building stone for protection against dampness and staining. The booklet will be found invaluable to contractors and builders often experiencing trouble from dampness, and a copy may be had free on application to the company at the given address.



Economy Methods in Concrete Foundation Work—Fig. 3—View of "Standard" Low Charging Mixers on the Job

The Ideal Mortar for Brick Masonry

Under the above title there has just been issued by the Hydrated Lime Bureau of the National Lime Manufacturers Association, Arrott Building, Pittsburgh, Pa., what is known as Bulletin J, bearing date of June 1, and giving the results of an investigation conducted by Prof. James S. Macgregor of Columbia University, showing the practical effect of hydrated lime on the strength of cement mortars subjected to the normal absorptive action of brick. The results also tended to demonstrate to the user the ideal mortar for laying up brick masonry. The statement is made that maximum strength with minimum expense in laying brick masonry can be obtained with a mortar mixture composed of ½ cu. ft. of Portland cement, ½ cu. ft. of hydrated lime and 3 cu. ft. of sand, or a 1:1:6 mixture. The Bulletin describes the mortars used in the investigation and the proportions in which they were mixed together with a summary of ultimate resistances, the results of the tests and a discussion of the results. Numerous pages are devoted to diagrams showing compression tests, all of which are of special value to the architect, the builder and the owner.

Economy Methods in Concrete Foundation Work

The economy of low charging and portability of a concrete mixer in building foundation work is shown in the methods used in connection with the construction of a three-story and English basement, fifteen-flat building recently completed for F. J. Campbell at Dorchester Avenue and Sixty-seventh Place, by Bundo Brothers, contractors, 938 East Seventy-fifth Street, Chicago, Ill. This firm of contractors makes a specialty of concrete foundation work for buildings and mix all of their concrete in a 12-cu. ft. "Standard" low charging concrete mixer. Fig. 3 of the illustrations shows the mixer in operation on this job. Another mixer of the same kind is shown in use in the construction of the foundations of an adjacent building.

In this work there were 5177 cu. ft. of concrete in the footings and four foundation walls. The time required to construct the "forms," mix and place the concrete was 42 hours, and the cost for setting "forms" and pouring concrete was 2¾ cents per cubic foot. Bundo Brothers employed only five men to operate the mixer, the remainder of their force being engaged in setting "forms" and other work. Two men are employed to deliver material to the mixer and three were required to wheel the mixed concrete to the "forms." The usual size of batch mixed was 10 cu. ft., but the contractors say that they effected a considerable saving in time by using a mixer with a drum capacity considerably larger than the regular batch. With this additional drum capacity it was not necessary to discharge all of one batch before the aggregates for another were inserted, and the work therefore proceeded without interruption. The contractors give as the three main features in the economy of operating their mixing plant the great portability of the mixer, enabling it to be readily moved to any required position on the job, the low charging features requiring few workmen, and the reserve drum capacity insuring least delays in operation.

The Pormo Portable Pumping Unit

An outfit for use in pumping out excavations and foundations which embodies features likely to interest the contractor, is the Pormo portable pumping unit made by the Aerothrust Engine Company, 328 Washington Street, Laporte, Ind. The point is made that the outfit is hand-portable because two men can easily carry it directly to the job. It is said to be so constructed that it can be put at work anywhere and the speed instantly changed while in use, thus offering a wide range in capacity. It has a high-tension waterproof built-in magneto. It is equipped with a Pormo

(Continued on page 78)

MEDUSA WHITE CEMENT



Residence of John C. Reid, Wheeling, W. Va. C. W. Bates, Architect. Wm. C. Baughman, Plastering Contractor. Exterior Plaster Finish of Medusa White Portland Cement.

Up-to-Date Houses Are White Houses

Architects are designing white concrete and stucco houses today as never before. Leading magazines are showing pictures of the artistic effects to be obtained with White Portland Cement. Leading contractors are building those houses by using

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the only Waterproofed White Portland Cement manufactured. It is the ideal medium for exterior construction. Stands up in all sorts of weather. Takes color perfectly. Houses made with Medusa Waterproofed White Cement are **durable, fireproof, sanitary.** It gives a house a character and distinctiveness which stand as a permanent advertisement for the builder. It saves you money because the waterproofing is already mixed at our factory—at a lower cost than you could mix it yourself.

People want white houses. Make sure that you do a good job by using Medusa—the first true White Portland Cement—or Medusa Waterproofed White Portland Cement—the only Waterproofed White you can buy.

Write today for booklet on Medusa Waterproofed White. It will help you on your next job.

The Sandusky Cement Company

624 Engineers Building Cleveland, Ohio

THE SANDUSKY CEMENT COMPANY

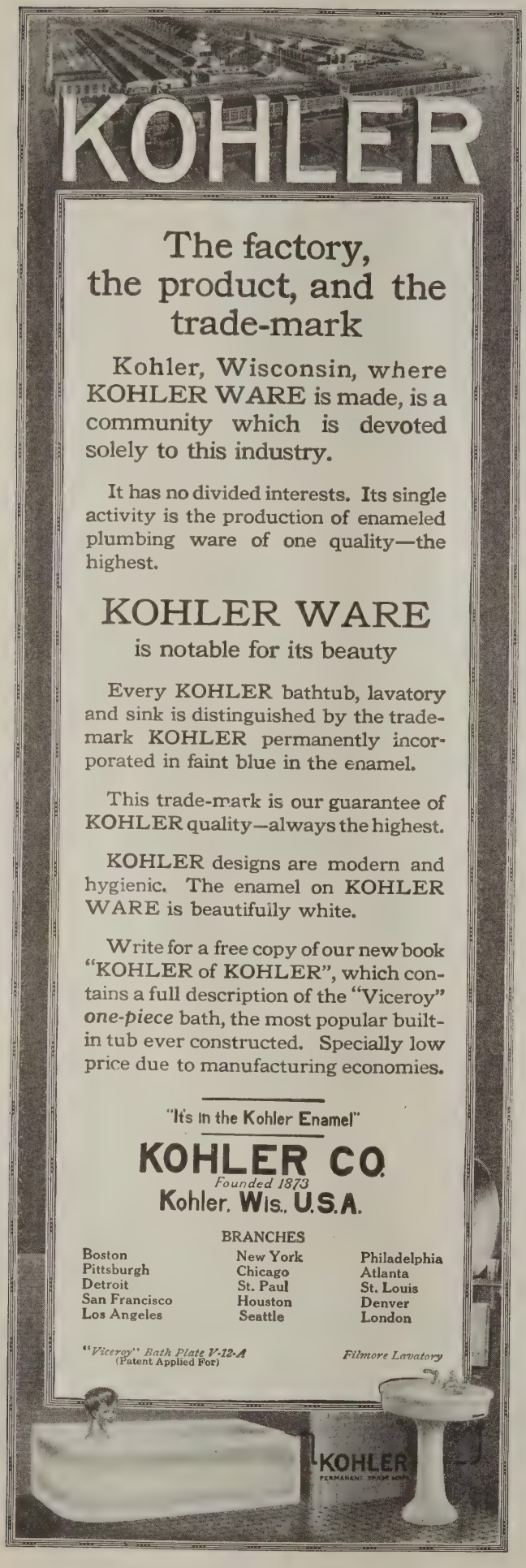
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engine with Gould centrifugal pump and has a capacity of 125 gal. per minute. The company has issued a catalogue setting forth the advantages of this pumping unit and a copy of it can be obtained by any building-contractor who may make application for it.

The "Davy" Gas Heater for Small Garages

During the winter months, the owner of the small garage desires a supply of heat in order to render the place comfortable, but it is seldom that he can satisfactorily accomplish this from his house heating system. He is therefore likely to be interested in the "Davy" Gas Heater which has been placed upon the market as a solution of the problem of heating small garages. The heater is constructed entirely of sheet metal having a galvanized crimped metal casing which is open at the bottom and covered with perforated metal at the top. Inside the casing and 2 in. away from all sides is a galvanized metal combustion chamber at the bottom of which in one corner is an intake. Above this and on the inside, is the burner. The yellow flame giving off its heat together with the hot gases of combustion are made to travel up to the top by means of a U-shaped deflector. In this way the heated air circulates and comes in contact with the entire surface of the combustion chamber which becomes the radiator. At the lower corner of one side of this radiator is a vent which permits the spent products of combustion

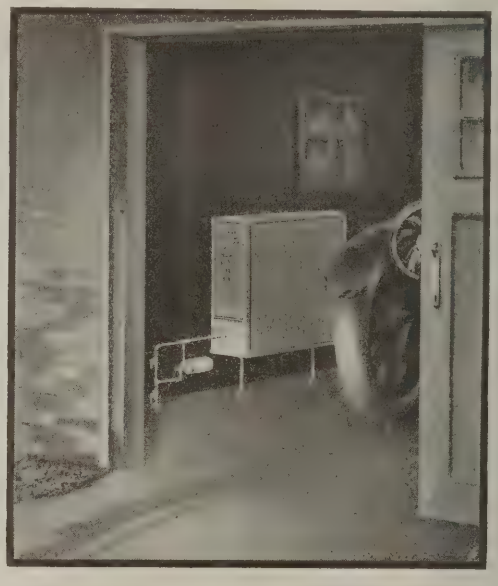


Fig. 4—View Looking Into a Small Garage and Showing the "Davy" Gas Heater in Place

to escape. The whole outfit is self-contained and supported on iron pipe standards. Ordinarily a ⅜ in. gas connection is required, but a thermostat as shown in the picture, Fig. 4, which represents the gas heater installed in a garage, may also be used for economy in gas consumption. The claim is made that in the case of garages of the smaller type, any gasoline vapor that may be in the air would combine with the supply and enter the burner through the intake and be consumed in the heater without any danger. The device is being placed upon the market by Kidde & Co., 90 West Broadway, New York City, and the construction has been approved by the New York City and other fire departments as a safe appliance to use in heating garages and other places where volatile and explosive vapors may collect, as in varnishing and cleaning rooms. It has also been approved by Boards of Health for use in moving picture theatres and in the home, as it is said it will not contaminate the air. The heater is offered in two sizes, one of which is intended for a garage measuring 16 x 20 ft. in plan and the other for a structure 20 x 26 ft. in plan.

Reeves Sheets and Sheet Metal Products

One of the most complete catalogs of sheet metal products which has reached our desk is the 254 page

(*Continued on page* 80)

A Beautiful Book Free

The 1916-17 edition of "Repairing and Building" is now ready.

It is beautifully lithographed and has many illustrations in colors, and in black and white. It shows exteriors and interiors of all kinds of buildings. Its object is to demonstrate to carpenters and builders the many attractive features of

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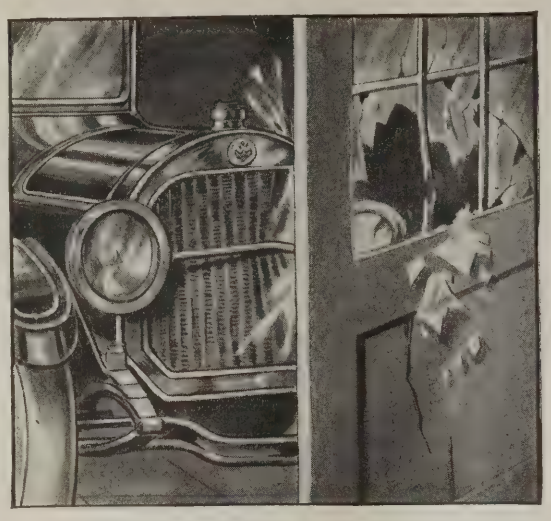


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An Unnecessary Accident—

On the garages you build, whether they are simple or elaborate, you will find it wise to use Stanley Garage Hardware and the

STANLEY GARAGE DOOR HOLDER

The Holder is strong and simple in construction, holds the door open against the heaviest gusts of wind, preventing damage to car lamps, bending of the fender or scratching of paint.

Our book "E" on Stanley Garage Hardware is really interesting, and contains much data of value to architects, carpenters and builders. May we send it to you?

Stanley Works

New Britain, Conn., U. S. A.

100 Lafayette St. New York

73 East Lake St. Chicago

publication sent out by The Reeves Manufacturing Co., Dover, Ohio. The work is profusely illustrated, attractively printed, bound in paper covers and gives evidence of great care in its preparation. The early pages are given up to a bird's-eye view of the company's plant at Canal Dover, also views of the shipping facilities. The shipping department is located in the center of the company's large warehouse, which lies parallel to the railroad tracks, and is served by both the Pennsylvania and Baltimore & Ohio railroads. The goods shown cover a very extensive variety, including practically everything in the sheet metal line likely to interest the architect, the builder, and the sheet metal contractor. Valuable tables are presented, giving sizes, weights and gages of sheets, also net prices of gutter per 100 ft. at various discounts—a feature which many in the trade will appreciate. The catalog is divided into sections, the first of which embraces roofing, another deals with eaves trough and conductor pipe, another with Reeves' metal tile so made as to represent most faithful imitations of clay tile; another section has to do with tin plate, and another with stove pipe and elbows. Probably the most attractive section is that relating to Reeves' artistic metal ceilings. In this section are shown a few of the large number of ceiling designs turned out by the Company, and showing most clearly the deep, rich embossing. The concluding sections are given up to charcoal iron and to various items of information likely to prove of interest and value to the trade. Included in the latter are suggestions as to weather conditions, the wind pressure on roofs, weights of roofing materials, general mathematical rules, temperatures, etc., etc. The catalog concludes with a comprehensive index alphabetically arranged. We understand that a copy of this handsome catalog will be sent to any reader of THE BUILDING AGE who may make application for it.

Irwin Improved Bit Shank

Announcement has recently been made by the Irwin Auger Bit Company, Wilmington, Ohio, that the shanks on Irwin bits will hereafter be made by an entirely new process. A patented measuring device has been perfected for attachment to the dies with which the shanks are made and because of the fact that the dies permit little or no variation all the shanks of the Irwin auger bits are now said to conform to one standard. Heretofore they were made by a hammering process, and the squaring of the shank was left entirely to the eye of the operator. The new process eliminates guess work. The corners of the four sides of this new shank fit into the

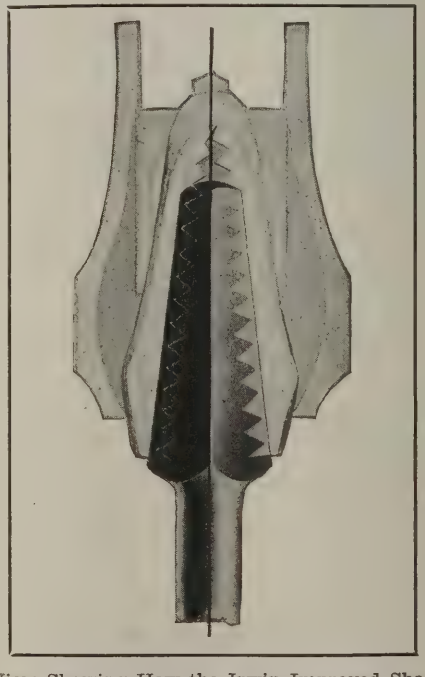


Fig. 5—View Showing How the Irwin Improved Shank Holds the Bit in Correct Alignment

(*Continued on page* 82)

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Send the coupon today for our **2 Big FREE Plan Books** showing over 300 houses **from $300 up.** Let our Contractors' Department work for you and **add 25% to 50% to your profits.** It is already increasing profits for over **10,000 other Carpenters and Builders in every State.** It is furnishing **free** "Guaranteed Right Estimates." It is assuring **prompt deliveries, cutting out lost time and labor costs.** It is **drawing plans** for them—far cheaper than local architects could. And it is doing a hundred and one other things. Make the Gordon-Van Tine Expert Service Department work for you. We sell

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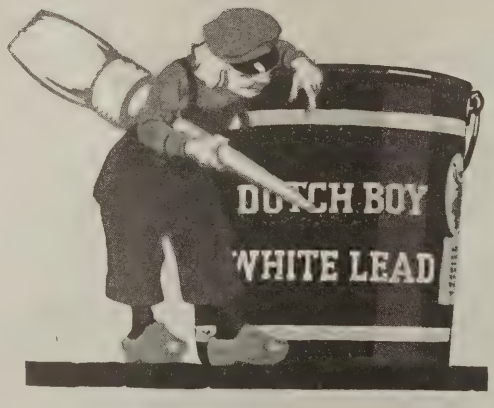
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Fiberlic
for Walls and Ceilings

FIBERLIC WALL BOARD—a root fibre product. A chemically cleaned, tenacious fibre made into board. Solves the requirements of wall board construction. Not an experiment. We have never changed our brand. Fiberlic Wall Board means one standard only. It was made right first.

NOTE: All our samples are cut from stock and truly represent what we ship.

FIBERLIC DEPARTMENT
MAC ANDREWS & FORBES COMPANY
CAMDEN, NEW JERSEY



NEW and distinctive markings have been adopted for the sides of all packages of Dutch Boy white lead. Instant identification of this reliable paint material is now easy.

Each black steel keg has the familiar figure of the Dutch Boy Painter and our guaranty on the side in brilliant orange. In addition, the words DUTCH BOY WHITE LEAD, in large legible type, appear between two bright orange stripes as shown in the illustration.

NATIONAL LEAD COMPANY
New York Boston Buffalo Chicago
Cincinnati Cleveland St. Louis San Francisco
Philadelphia (John T. Lewis & Bros. Co.)
Pittsburgh (National Lead & Oil Co.)

angles of the jaws of the brace chuck in such a way that the bit will be held always in correct alignment. This is accomplished by the sides of the shank being perfectly square. If there were even a slight variation in one or more sides the bit would be held at an angle and cause an imperfect cut. The company states that if a number of these new bits are placed with the sides of the shanks touching each other they will form a circle, thus proving the accuracy with which the shanks are made. In Fig. 5 is shown the manner in which the improved shank holds the bit in proper alignment.

The "Brackett" Hollow-Chisel Electric Mortiser

A mortising machine embodying features of construction which cannot fail to strongly appeal to the carpenter-contractor, the builder and, in fact, all operators of small wood-working shops, is illustrated in Fig. 6. It is known as the "Brackett" hollow-chisel electric

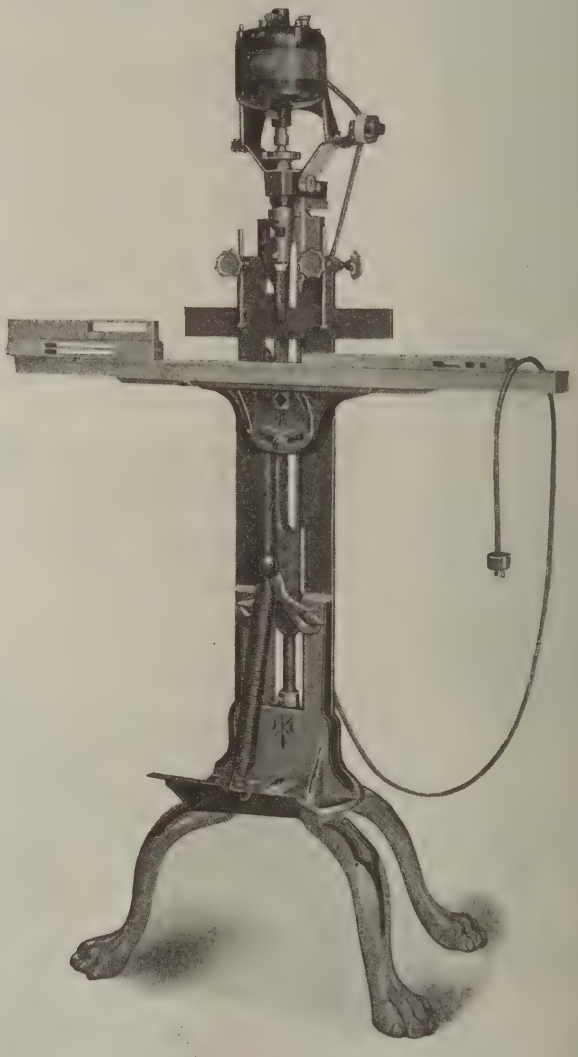


Fig. 6—General View of the "Brackett" Hollow Chisel Electric Mortiser

mortiser, and is so made, it is claimed, as to entirely overcome the objectionable feature of "split" chisels. The point is made that the bit will cut cypress, spruce, yellow pine, fir or other pithy wood, and do it quickly and cleanly, without injury to either bit or chisel. The special construction of the bit and the high speed at which it turns are the basis of the success of the machine. The arrangement of parts is such that the chips are cut as fine as saw-dust and are rapidly elevated through the chisel and discharged through two large openings, thus instantly relieving the bit from excess friction and eliminating the strain on the chisel. In other words, there is practically no chance to "choke" the chisel with chips. The picture here presented offers an excellent idea of the general appearance of the machine and arrangement of parts. It is being placed on the market by Warren W. Morse, of Hopkins, Minn.,

(*Continued on page* 84)

CORBIN



LEVER HANDLES

have an artistic value and an individuality which commend them to people of discriminating taste. They are especially desirable for doors with narrow stiles, French windows and cabinets, and can be used instead of knobs on any Corbin escutcheons. We illustrate a few selections from a large assortment. Full particulars on request.

P. & F. CORBIN

The American Hardware Corporation Successor

NEW BRITAIN, CONN.

The Wheel of a STERLING WHEELBARROW

and its

Pre-Lubricated Bearings

When all's said and done, the difference between a good wheelbarrow and a poor one is mainly in the wheel and its bearings.

In making the Sterling Wheel we first upset the shouldered Steel spokes into the heavy steel rim, as shown in Fig. 1.



Fig. 1—Spokes into rim, ready for casting the hub.

Then the long sleeved steel hub is set into a special shaped mold, and molten iron is poured into the mold, cementing spokes and hub into one solid piece, as shown below in Fig. 4.

The Steel Sleeve of the hub is fitted with pre-lubricated fiber bushings, as shown in Fig. 2.

These bushings are filled with a composition of oils which thoroughly penetrate the pores. The bushings are then driven into the hub under great pressure. The longer the cold drawn steel axle turns in these bushings the smoother they become, and they never require oiling.



Fig. 2—Pre-Lubricating fibre bushings.

This bushed hub revolves round the axle. Note that it fits into recesses in the end-brackets (see Fig. 3). This construction affords valuable protection against sand and dirt.

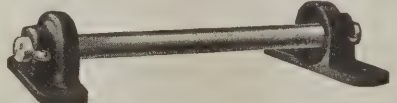


Fig. 3—Stationary steel axle and malleable end brackets.

The axle is cold drawn steel. See how it is keyed to the end-brackets with cotter pins, and how the malleable brackets themselves are secured to the bottom of the nose-end of the handles. There are no nuts to work loose; no side play; nothing to get the "ricketts."

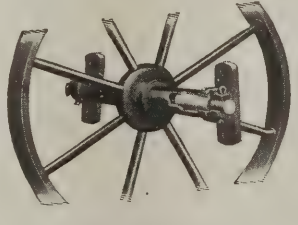
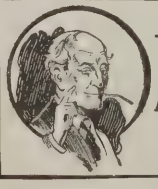


Fig. 4—The completed wheel.

This is a **real** wheel, friends; built to last; a wheel that ensures light, noiseless traveling under the heaviest loads.

There are a lot of other exclusive features about the Sterling Wheelbarrow, but its wheel alone is enough to make the discriminating buyer give it a very decided preference.



—"'an it's THE Barrow"—

—Tim Trundle

Send for our Catalog No. 24

Sterling Wheelbarrow Company

6201 Shenners Avenue West Allis, Wis.

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

who states that the machine is sold strictly on its merits and that if not as represented it may be returned, and the money will be refunded or the builder can make arrangements to test out the machine in his own shop before paying for it.

The "Alamo" Schoolroom Heater

Building contractors and architect-builders who are often called upon to recommend an efficient heating equipment suitable for schoolrooms are likely to find many points of interest in the apparatus manufactured by the Alamo Heater Company, 70 West Lake Street, Chicago, Ill. In the first place it is important to mention that the heater is provided with a humidifying device which insures the pupils getting an atmosphere containing a healthy and comfortable percentage of moisture. The "Alamo" heater is gas proof because it is jointless, being made from wrought steel which is welded into one piece by an acetylene process. This body is 22-in. diameter, and is surrounded by a 34-in. casing. With all castings set back this far from the casings it removes all danger of the pupils burning themselves. The equipment is 60-in. high. The fire-pot is 20-in. dia., and a generous grate surface 17-in. dia. is provided. It is suggested that the heater be



Fig. 7—Broken View of the "Alamo" Schoolroom Heater Showing Internal Construction

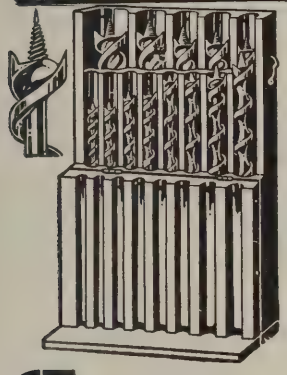
installed on a cement base so that all danger of fire may be avoided. Foot warmers can also be placed on either side of the heater, the doors and slides for which are made of wrought steel. A continual supply of pure, fresh air is assured by an outside duct which should make connection with the heater either above or below the floor. A small fire in the heater makes a positive upward current of foul air which is conducted through the roof by means of a concealed duct. Each equipment is furnished with the humidifier, three lengths of 7-in. planished iron smoke pipe, one 7-in. adjustable elbow, and one smoke collar. Additional material can be had according to requirements. A view of the heater is shown in Fig. 7.

Municipal Swimming Pool in Toledo

One of the popular objections to concrete by those not altogether familiar with the material is that it is often subject to percolation, discoloration, efflorescence and other defects due to the action of water. An interesting example of the value of a waterproofing compound in obviating these objections is to be found in the present excellent condition of an open-air swim-

(*Continued on page* 86)

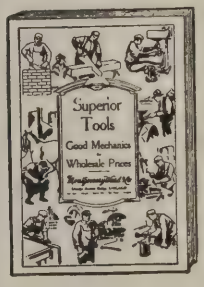
A Set of Bits for Your Tool Chest



A Box of Bits at a Bargain Price - $3.40

A full set of 13 of our popular Lakeside Solid Center Stem Auger Bits. Double cutter, two spurs, standard double thread screw. Bore fast and true.

Finest steel, correctly shaped, well tempered, finely polished. One each 1-4, 5-16, 3-8, 7-16, 1-2, 9-16, 5-8, 11-16, 3-4, 13-16, 7-8, 15-16, 1 inch, in handy, upright wood box, hinged cover, nicely varnished. Shipping weight, 5 1-4 lbs.



One of the many bargains from our big stock of tools. May we send you our Tool Book? It's FREE. Buy tools at wholesale prices.

Montgomery Ward & Co.

Dept. AH533

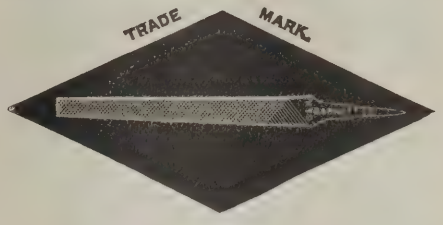
Chicago Kansas City New York

Ft. Worth Portland, Ore.

Order from most convenient house.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company

Philadelphia, Pa.

Owned and Operated by Nicholson File Company

Everybody Working—and Work for Everybody

OLD plants enlarging; new plants being rushed; houses springing up everywhere — carpenters working overtime. ¶ All this means the greater need for better conditioned tools, so carpenters and craftsmen are urged to keep handy in their tool kits

Carborundum Sharpening Stones

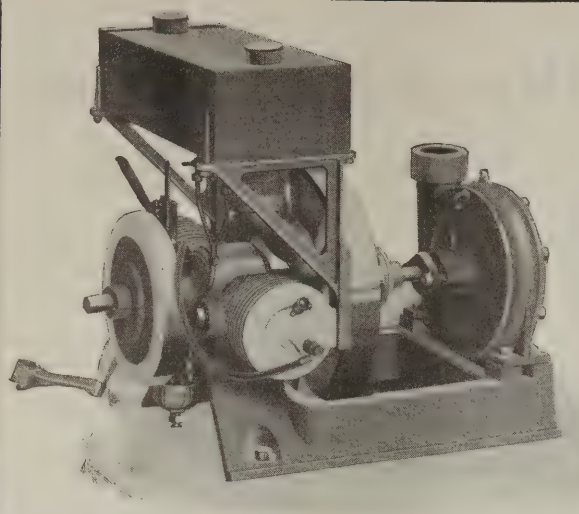
They put new life into edge tools—keep them keen with an edge that lasts and keeps up with the rush. ¶ Carborundum *cuts* the edge on the tool.

Carborundum Round Combination Stone, No. 107	$1.00
Carborundum Oblong Combination Stone, No. 108, 8-inch	1.25
Carborundum Gouge Stone, No. 166	.50

And don't forget Carborundum Niagara Grinders for your work bench.

From your hardware dealer or direct

The Carborundum Company, Niagara Falls, N. Y.



PORMO PORTABLE PUMPING UNIT

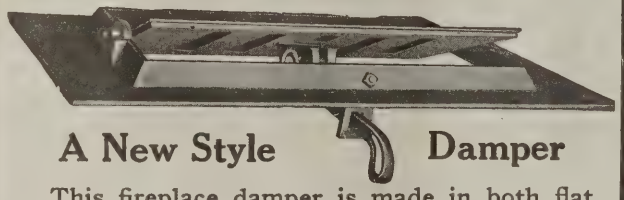
By far the lightest weight, most efficient and most economical portable pumping plant. Can be put at work anywhere. Speed instantly changed while running, offers a wide range in capacity and variation, making it

The Ideal Outfit for Contractors

in pumping out excavations and foundations. Really hand portable—two men can easily carry outfit right to the job. High tension, water-proof, built-in magneto.
Pormo engine is a wonder of simplicity, economy and efficiency, complete with Gould Centrifugal pump. Weight only 160 lbs. Capacity 125 gallons per minute. Write today for complete catalogue.

Aerothrust Engine Co., 323 Washington St. La Porte, Ind.

FIREPLACE MATERIAL



A New Style Damper

This fireplace damper is made in both flat and dome styles. The lever sets under the first row of brick, unexposed, but very accessible and easily operated.

Also made with lower lever so a steel angle can be placed under edge of damper. We make several other style dampers.

Catalog 1590 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

"SEND COUPON TODAY" Stover Mfg. & Eng. Co., 747 East St., Freeport, Ill.
Send the undersigned information regarding your
Name .....
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Stover Mfg. & Eng. Co.
747 East Street
Freeport, Ill.

ming pool built three years ago in City Park, Toledo, Ohio, in connection with which Medusa Waterproofing was used. A half-tone engraving of the pool and interesting information relating to Medusa Waterproofing is contained in a four-page folder being sent out by the Sandusky Cement Co., 624 Engineers Building, Cleveland, Ohio. The swimming pool is 60 x 180 ft. and from 1 to 4 ft. deep, contains two basins and is surrounded by a walk 12 ft. wide. It is said that no leaks have developed, which is a good testimonial from "Time" as to the merits of this waterproofing.

The Blue Book of Traffic

A *brochure* of decided value to the builder or contractor interested in motor trucks is "The Blue Book of Traffic," handsomely printed on coated stock, with an attractive blue border running around the pages. There are 102 half-tone engravings, featuring motor trucks used in over fifty different lines of business and, as the engravings are two to a page, they are of sufficient size to enable a prospective purchaser to obtain a good idea of this line. Considerable space is also devoted to a description of the various units and construction of these trucks, together with condensed specifications, accompanied by a side view and also a view from underneath the chassis of each style. Photographs of worm drive trucks only are reproduced, for the reason that the Federal Motor Truck Co., Detroit, Mich., who issues this *brochure,* are now only manufacturing this style of drive. Three photographic views show the first Federal plant and its growth to its present size. As the *brochure* is a comprehensive treatise on motor trucks, presented in such a manner as to make the subject one of interest to the ordinary layman, it cannot fail to prove instructive to every building contractor contemplating the use of a motor truck in his business.

Convention of Sargent & Co. Salesmen

The annual convention of the salesmen of Sargent & Co., New Haven, Conn., was held at the factory during the week beginning June 26, and was attended by members of the selling force from all parts of the country and one representative from Australia.

The sessions were held in the convention hall, which was appropriately decorated with the national colors and contained a complete display of the advertising material issued by the company, also many samples of the new goods which have been made since the meeting of last year. Two sessions were held daily, the entire time being devoted to the consideration of business conditions and methods of marketing the product of the company. These sessions were presided over by Henry B. Sargent, who opened the convention with a few words of welcome and closed it on the last day with an inspiring address.

On Tuesday evening, June 27, the banquet of the salesmen and factory heads of departments, which is a feature of the annual convention, was held at the Shoreham Hotel, about 150 being present. The company was placed at small tables so arranged that the factory men and those from out of town were seated in alternation, giving them all an opportunity to renew acquaintances and exchange experiences. At each place was a souvenir paper cutter made at the factory, representing a front door escutcheon and knob in an ornamental design and bearing the company trademark and the date.

Addresses were made by Henry B. Sargent, vice-president and general manager; Joseph H. Cherry, manager of the export department; John H. Shaw, factory superintendent, and F. W. Robbins, of the New York office.

The "Highwood" Dumbwaiter

The Highwood Dumbwaiter Company, 134 Highwood Avenue, Leonia, N. J., calls attention to the fact that its "Highwood" dumbwaiter is furnished ready to erect and can be easily installed by any carpenter or builder.

(*Continued on page* 88)



Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as he expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

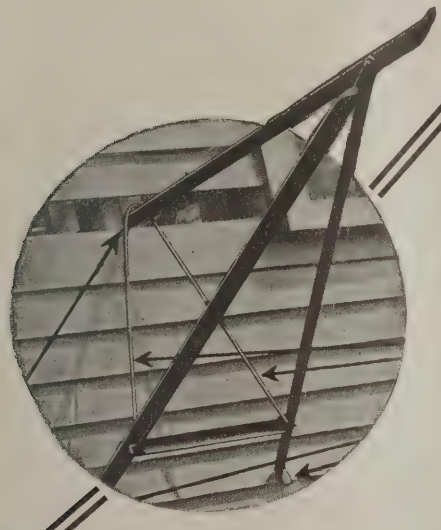
A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

Occupation.....

City..... State.....



Stability

Take a Look

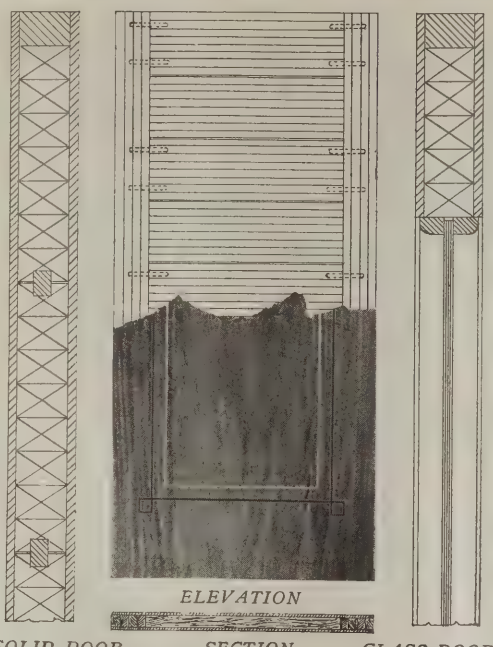
At the Two Sturdy Legs

And then you will know why you and your men will feel as secure on the "Trouble Saver" Brackets as you do on any part of the house itself. Notice how the legs brace against each other at the outer end, thus preventing all side motion.

You know how many wooden scaffolds you can erect in five hours. You can erect as many "Trouble Saver" Brackets in five minutes. No nails, no bolts, no nuts—not a screw.

A trial will prove their worth. We will lend them to you for that trial. Write for proposition.

The Steel Scaffolding Co.
Evansville Ind.



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

Manufactured by

HYDE-MURPHY COMPANY

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.



Stanley Improved Leveling Stands

A Stanley Level Stand used in connection with a wood or iron level, and a pair of level sights will be found in many cases a very satisfactory and inexpensive substitute for the more expensive surveyors' instruments.

By its use one can readily determine levels from a given point to one at a distance, such as locating or setting the profiles for foundation work, ascertaining the proper grades for drains, ditches, etc.

It can be placed on a stake or crow-bar and adjusted to a horizontal position even though the stake or crow-bar may not be exactly perpendicular.

A thoroughly practical tool.

Price of Stand with a 12-inch metal level and a pair of level sights—$4.50.

Price of Stand only—adapted for either wood or metal level—$2.00.

Send for special circular.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

The price at which the company is offering this dumbwaiter, announced elsewhere in this issue, includes a 24-in. square car, machine set on timbers, counterweight, ropes, nails, etc.; in fact, everything that is required to render the apparatus complete. The point is made that it is of substantial construction, practical design and easy operating. A strong point which the company makes is that satisfaction is guaranteed or the money will be refunded. A catalog which has been issued illustrating and describing the dumbwaiter can be had by making application to the address given above.

Arkansas Soft Pine in Building Construction

There are houses scattered throughout the country which were built long before the Revolution, and are to-day in an excellent state of preservation, ordinary care having made them endure through the centuries, so that there is no reason to doubt the durability of wood. Among the woods of quality Arkansas soft pine lays claim to a prominent place, as it was used in houses erected sixty or sixty-five years ago and which are still in a habitable condition, even though few of them have received proper care. Yellow pine, of which general species Arkansas soft pine is an aristocratic member, came into general use in sections other than its native state about twenty-five years ago. A now rapidly disappearing prejudice was at first felt against all yellow pine owing to the relationship with so-called Georgia or pitch pine, but it is claimed that Arkansas soft pine possesses none of these objectionable qualities. The latter wood is light, tough of fiber and has a soft, lustrous, satin-like texture, being therefore adapted to interior woodwork of all sorts. The beauty and wide variety of grain is said to make the wood useful [illegible] imitation of oak, mahogany and similar effects, while it also serves as an excellent basis for white enamel finishing, as it will permit of a mirror-like smoothness and will not discolor the finish from underneath. Arkansas soft pine is supplied in various lengths, including 12 ft., 16 ft. and 20 ft., so that in many cases a floor may be laid of single board lengths, thus minimizing the number of end joints. All of these facts, as well as other interesting information regarding this wood, are to be found in a handsome *brochure,* entitled, "Not a House but a Home," which is being sent out by the Arkansas Soft Pine Bureau, Little Rock, Ark. The advantages of Arkansas Soft Pine are set forth in connection with its use in framing and interior finish, including instructions for waxing, varnishing, etc. Features of foundation work, plaster, etc., are briefly discussed, and among the many illustrations is a panel showing the different grains of the wood. Instructive material relative to finishes like dull varnish, silver grey, enamel, gloss varnish, natural finish, etc., together with general directions for their application, are also set forth. A valuable feature of the handsome work is a series of six designs of houses, including plans, elevations and details, with the cost of different classes of work in connection with each design. The houses shown range in cost from $1,200 to $12,000, and have been specially designed along Colonial lines for the *brochure* by Aymar Embury II, a well-known New York architect. These houses, the architect states, were designed primarily with the intention of obtaining as large a percentage of the area of each house in usable rooms as possible. In regard to the exterior, the architect says: "There was one point which was borne constantly in mind, and that was that the apparent height of the buildings must be reduced as far as possible. The greatest difficulty with most of the carpenter-built houses of to-day is that they are too high for their length and breadth, and the long, low effect so charming in old work is absent from them. The height of a building is a relative matter. A cornice 17 ft. from the ground in a building 70 ft. long, gives the effect of a long, low house, but a cornice 17 ft. from the ground in a building 21 ft. long will give it almost the appearance of a tower, and the cornice heights of all the houses therefore have been considered with relation to their lengths and breadths." He states he has endeavored in the design of these exteriors "to avoid the most common of all faults—the introduction of too

(*Continued on page* 90)

The largest plant in the world, the most modern equipment, and seventy-six years of specialized experience are behind

DISSTON



SAWS

That's why there are probably more of them sold than all other makes combined.
The carpenters know.

HENRY DISSTON & SONS, Inc.

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.

No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.



For full description of this and other
SARGENT WARRANTED PLANES
SEND FOR SARGENT PLANE BOOKLET
SARGENT & COMPANY
Makers of Squares, Planes and Mechanics' Tools
53 Water St. New Haven, Conn.

CONCRETE FOR PERMANENCE

There's money in Stucco

More and more people are choosing Stucco for their homes, garages, etc., because Stucco is permanent, beautiful, can be built fireproof, is low in first cost and lowest in upkeep cost—it gives lasting satisfaction.

Many contractors are cashing in on the opportunity in Stucco, for new homes and garages, also for porches, pavilions, pergolas, greenhouses, dairies, renovating old homes, etc.



Atlas Cooperation

There's Stucco business all around you. Let us help you to get more of it. Write for our free book giving Stucco specifications and other information, and for the Contractor's Atlas, a free monthly publication, chuck-full of valuable suggestions. Use the coupon below.

The Atlas Portland Cement Co.

Members of the Portland Cement Association

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Phila. Boston St. Louis Minneapolis Des Moines Dayton

PORTLAND ATLAS CEMENT

many models in a small space. The very large house can stand a variation of façade by the introduction of gables, bays or other similar features, but the small house must exhibit in its façade a single idea, carefully thought out, and must depend for its effect upon the just proportion of its height, length and breadth, together with perfection of detail." Care has been taken to render the heating and plumbing economical, one chimney sufficing for kitchen range and living room fireplace, and the bathroom has been placed over the plumbing on the first story.

Modern Plumbing

The architect, the builder and the house owner are interested in modern plumbing equipment, and they are therefore likely to find much to command their attention in the handsome catalog of 138 pages which has just been issued under the above title by the J. L. Mott Iron Works, Fifth Ave. and 17th St., New York City. It is known as "No. 10" and contains a vast amount of information relating to up-to-date plumbing fixtures, accompanied by well executed half-tone engravings, showing bathroom interiors with the fixtures installed. Among noticeable features of the catalog are lavatories with iron brackets and shields, thus eliminating pedestals, legs or metal brackets which are difficult to keep clean; toilet tables with iron brackets and vitreous china shields; siphon-jet water-closets with cabinet finish quartered oak or birch-stained mahogany chairs with push-button flush valve concealed in the floor, and bath tubs with rain shower having adjustable ball joint and arm attached to the wall, also anti-scalding valve concealed in the wall, concealed waste, etc. The idea of the catalog is to show a large variety of well-designed fixtures, thus making it possible for the taste and individuality of the architect and owner to be reflected in the character of the fixtures chosen. In connection with the various fixtures shown are brief descriptive particulars, dimensions and prices, all arranged in a way to prove of the greatest advantage. In addition to bathroom fixtures, attention is given to kitchen sinks and laundry tubs. Especially interesting is a floor plan of a kitchen with a butler's pantry and laundry showing the proper position of each of the various fixtures constituting the equipment. There is also a picture showing some of the salient features of a well-appointed modern kitchen.

New Factory for Sasgen Derrick Co.

Among recent expansions along industrial lines in Chicago, Ill., a notable instance is seen in the case of the Sasgen Derrick Co., which for several years has operated a plant at 2053 North Racine Avenue, and is now confronted by a situation which makes greater facilities and equipment imperative. A new plant, 57 x 207 ft., is in course of construction at the corner of Grand Avenue and Albany, and the site will have the advantage of railroad facilities from the Chicago, Milwaukee & St. Paul line. The factory will be a one and two-story building, and of mill construction. Besides adding considerable to the factory quarters the new plant will house commodious offices and a garage. The first floor of the two-story section will contain the machine shop and stock rooms, while the second story will house the offices and salesrooms. The entire one-story section will be devoted exclusively to a carpenter shop. The factory throughout will be operated on a modern efficiency basis and its capacity will be increased about 200 per cent by these improvements. The company will therefore be enabled to handle its increasing business for builders' derricks with every guarantee of prompt service and general satisfaction.

Soller's Self-Calculating Scale for Stair Builders

We have received from Russell C. Smyers, 17 West Water Street, Mount Union, Pa., a copy of a self-

(*Continued on page* 92)

Put This in Your Kit

Here's a tool no carpenter can afford to be without to meet the unusual boring situations that come up.

MILLERS FALLS
EXTENSION BIT HOLDER No. 6



Chuck follows into a 5/8-inch hole yet holds bit with an immovable grip.
Jaws of one piece of the toughest steel.
Outer sleeve telescopes over inner spindle, combining lightness and strength.
Takes up little room in the kit—extended easily in a second—Collapsed 16½ inches, extended 24 inches.
Mechanic's Handbook — full of valuable information never compiled before—free on request. Send for Pocket Catalog.

MILLERS FALLS CO.
"Toolmaker to the Master Mechanic"
Millers Falls Mass.
New York Office: 28 Warren Street

Ornamental Molds for Quick, Sure and Easy Profits

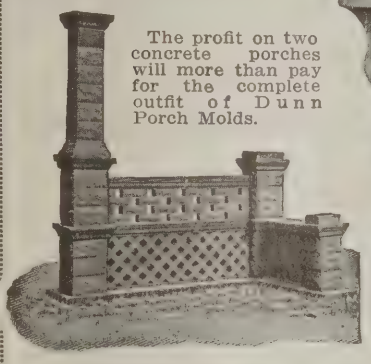
Cost little to make and sell readily at good prices. Hundreds of builders are making big money with them. Do not necessitate a large investment, but assure a permanent source of income.

Full particulars and prices on molds for making all kinds of ornamental concrete products given in our Ornamental Mold catalog; free upon request.

The profit on three vases will more than pay for Dunn Vase Mold.



The profit on two concrete porches will more than pay for the complete outfit of Dunn Porch Molds.



Our general catalogue describes Dunn Tile Machines, Mixers, Block Machines, etc. Write for a copy.

W. E. Dunn Mfg. Co.
416 24th Street, Holland, Mich.

Here's a New Vise "YANKEE" No. 1993

With Swivel Base. DETACHABLE



Quickly detached from swivel base by the turn of a set screw; and being accurately machined all over can be used in any position as a jig for special work on drill press, shaper, etc.

Holds work rigid at any angle with use of the special grooved block.

The swivel base is easily and firmly locked and released in any position by a short movement of lever at the side. Jaws 2¾ in. wide, 1⅞ in. deep, opening 3⅛ in., base 7½ in.

Ask your dealer to show you.

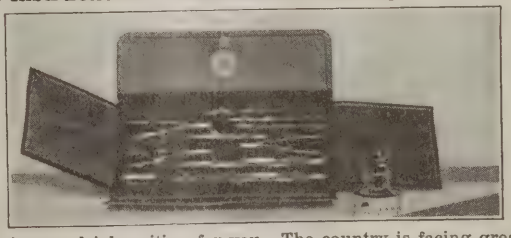
Let us send you the "YANKEE" Book. A postal brings it.

Tells you all about the "Yankee" line

NORTH BROS. MFG. CO.
Lehigh Ave., PHILADELPHIA, PA.

Here's *YOUR* Chance to Learn DRAFTING

This Complete $15 Drawing Outfit and Full Instructions in Mechanical Drawing FREE



There's a good job waiting for you. The country is facing greater prosperity than it has ever before experienced. Far-seeing men are getting ready for boom times. Get this training now and share in the coming prosperity.

A WONDERFUL CHANCE

for Carpenters, Bricklayers, Plasterers, Foremen, Superintendents, Contractors *and all other men in Building Lines.*

STUDY AT HOME Devote your spare hours for a short time only and get in the class drawing the big pay envelope. Hundreds of men are in daily attendance at this old established college. In your own home you can do the same work these men are doing, and the same experts that teach them will guide you toward the big job. They will prepare your instruction matter. Your work is examined and approved by them. No books to sell. Live, up-to-date blue prints of work in actual construction. These men know exactly the practical training you need because they are in constant charge of big work.

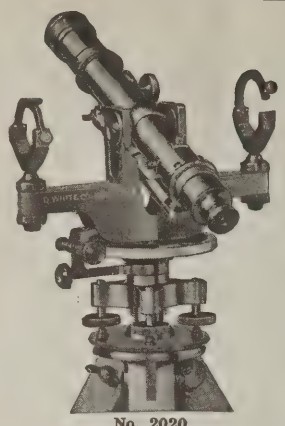
ACT NOW—FILL OUT COUPON TODAY

Mark "x" opposite work in which you are interested. Without obligation on you we will send full information.

☐ Architectural Drafting ☐ Plan Reading
☐ Builders' Course ☐ Estimating
☐ General Contracting ☐ Building Superintendence

Name .....
Address .....
Town ..... State .....
College or Home-Study Course .....

CHICAGO TECHNICAL COLLEGE
1020 Lake View Building, Chicago, Illinois



No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.

Pullman

ALL STEEL **Unit Sash Balances**



Noiseless

Is the word that describes the operation of the Pullman Unit Sash Balance. All parts are in the casing—nothing can rub or interfere with the spring action. There is nothing to squeak, rattle, bang or stick. Once installed and it will never require contractors', builders' or architects' attention. There is in every Pullman Sash Balance satisfaction for owner and builder alike. Guaranteed for 10 years.

Our catalog with blue print gives full particulars. May we send one?

Pullman Mfg. Co., 8 Industrial Street Rochester, N. Y.

"NICE" ON THE LABEL MEANS BEST

REG. TRADE MARK **NICE** VARNISHES PAINTS

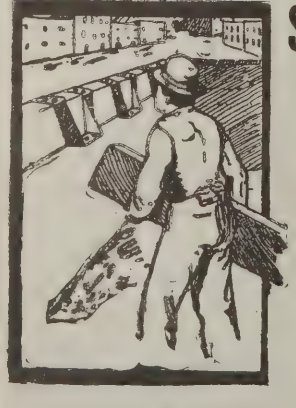
Look for It

See that mark and then you will know the Shingle Stain or Varnish or whatever it may be is O. K.

"Nice" Shingle Stains come in 16 soft, rich, durable shades. Unequalled in their preservative qualities. Write for our catalogs.

Varnishes
Fillers
Paints
C-M-T Coating
Colors

Eugene E. Nice
Phila., Pa. Camden, N. J.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, acauat load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

calculating scale for stair builders, which he is offering to the trade at a price of $1.00. The work consists of a series of tables which divide any height for stairs beginning at 2 ft. into the indicated number of equal spaces and is carried by increases of single inches to 16 ft. The divisions are given in inches and hundredths of inches. The calculator also divides treads as well as rises, and the tables may be doubled or increased any number of times to divide any space desired.

New Line of Heppes Asphalt Shingles

In order to meet the demand for an asphalt shingle of the same quality as its diamond point slab, but different in shape and appearance, the Heppes Company, Dept. G-1011 Kilbourne Avenue, Chicago, Ill., has brought out what is known as Style 4 Square Butt Slab. Like the diamond slab, this new style is really 4 shingles in one, and a considerable saving of time over the old way of laying single shingles is said to be effected. No time is wasted in chalk-lining because the slabs automatically space and gage themselves. They give the appearance of single rectangular asphalt shingles with the economy of the slab.

TRADE NOTES

"The Roof of Eternal Youth" is the title of an attractive catalog sent out by the F. C. Sheldon Slate Co., Granville, N. Y., and within its covers interesting comments are presented regarding the product of the company. These slates are mined in a variety of natural colors, sizes and thicknesses, and are said to harmonize closely with any individual color scheme it is desired to employ. Several pages are devoted to photographic reproductions of slates showing approximately their natural colors.

W. H. Bennett, for over two years with the Marsh-Capron Mfg. Co., Chicago, Ill., has accepted a position with the Searchlight Co. as advertising manager.

The T. L. Smith Co., 3120-H Hadley Street, Milwaukee, Wis., announces that its district manager, E. R. Marker, has removed to 609 Wells Street, Milwaukee, where he will act as Wisconsin representative, carrying a stock of mixers on the floor and a complete line of contractor's supplies.

The honor of being the first fire department in the state of Connecticut to motorize is claimed by that in the city of Middletown, which has recently purchased another Federal tractor to be used with the hook and ladder. This little item is found in *Traffic News*, the house organ of the Federal Motor Truck Co., Detroit, Mich. There is also much other information bearing upon the motor trucks of this concern which cannot fail to prove interesting to building contractors who are thinking of substituting vehicles of this nature for horse teams.

When making corrections or notes on blueprints it is usual to employ a red pencil, but this combination of red or blue is apt to prove trying to the eyes. A white pencil is by many thought preferable and Dixon's best white pencil No. 352 is intended for this purpose, says the July issue of *Graphite*, the house organ of the Joseph Dixon Crucible Co., Jersey City, N. J. To the owner of an automobile it is interesting to note that all those who finished in the Sixth Annual Indianapolis Sweepstakes Motor Derby used Dixon's graphite automobile lubricants. Other items of information along similar lines are contained in the July issue.

The L. & I. J. White Company, Buffalo, N. Y., is directing special attention to its flooring pattern of hand axe. The tool is made with the end perfectly straight and at right angles with the handle, so that either in pounding or cutting the handle clears itself from the floor, which does away with a lot of bruised knuckles on the part of the workman and poorly finished jobs. The company expresses a preference for the mechanic to give his orders through his local dealer,

(*Continued on page* 94)

Summer Is Building Time

Soon there will be a demand in all localities for men to build new barns.

This call is welcomed by the contractor who uses *PORTER SERVICE*, since he knows he can build the new barn in double-quick time and guarantee a thoroughly modern and workmanlike job.

Consider what it means to receive authentic and practical data covering the construction, arrangement, ventilation, etc., of each *individual* barn. That's what *PORTER SERVICE* renders—and it's *FREE*.

SERVICE
that which identifies
PORTER BARN EQUIPMENT

The name *PORTER* is identified with that practical and durable kind of *BARN EQUIPMENT*.

J. E. PORTER CO.
638 Fremont Street, OTTAWA, ILL.



"KOLESCH" TILTING LEVEL

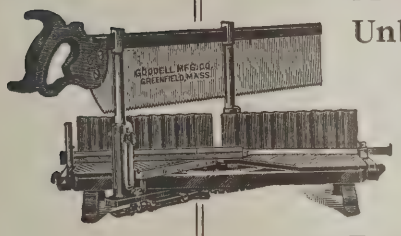
is designed especially for Builders in leveling walls, laying out angles, grading streets, sewers, drains, sidewalks, etc.

Complete in polished box with plumb bob, adjusting pins, metal trivet, book of instructions and tripod. **$57.50**

Send for 300 page catalogue; free.

Kolesch & Co., 138 Fulton St. NEW YORK

GOODELL PRATT
1500 GOOD TOOLS



ALL - STEEL MITRE BOX

Unbreakable

Many Special Features

Circular Free to You

Goodell-Pratt Company

Toolsmiths

Greenfield Mass., U. S. A.

Wonderful

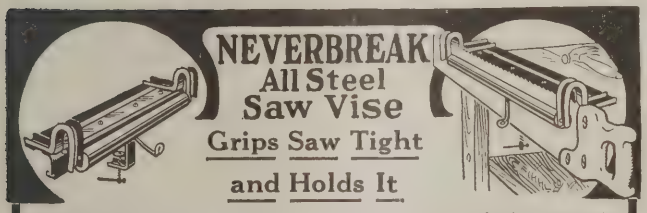
That's the word that best describes this instrument. In but a few moments you can convert it for use as a level from its position for taking vertical sights without detaching the axis from the telescope.

Write for catalog of our IMPROVED CONVERTIBLE LEVEL and our full line of drawing materials, etc.



New York Blue Print Paper Co.
58-60 Reade St., New York





NEVERBREAK All Steel Saw Vise

Grips Saw Tight and Holds It

Eccentric bar locks saw full length. Heaviest pressure will not loosen saw while sharpening teeth. Rubber jaws make vibration and consequent slipping impossible. Fully protected by valuable patents.

Strong—Compact—Light

Cannot break—made of specially treated steel—all parts welded—not riveted. Adjustable clamp holds tool to bench.

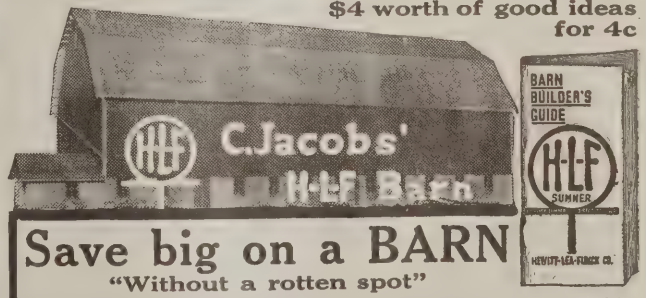
Two Sizes } No. 57—Weight 1½ lbs. Length Jaw, 9½"..... 60c
No. 67—Weight 1¾ lbs. Rubber Jaws, 10" long. 85c

If your dealer cannot supply you—send order to us, mentioning name and address of dealer

We'll prepay.

CLIPPER TOOL CO., 286 Mills St., Buffalo, N. Y.

$4 worth of good ideas for 4c



Save big on a BARN

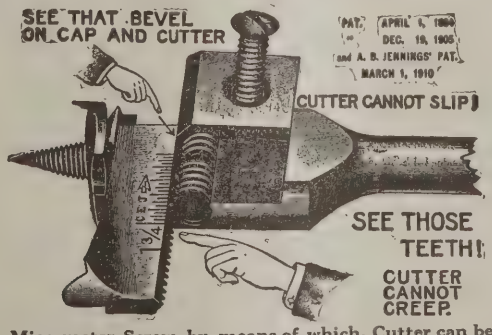
"Without a rotten spot"

Send material bill NOW for freight-paid price on barns you're going to put up this fall. Find out what a big saving you can make on fir—best material on earth for barns. So good the owner of barn pictured above wrote: "Here's a picture of a barn without a rotten spot in it." Build of fir—give your customers a strong, tough and lasting barn that will outlive their children.

Send 4c for H-L-F Barn Builder's Guide. Gives pictures, plans, specifications and cost complete of good barns. Full of latest barn-building ideas, including H-L-F self-supporting truss. The H-L-F Material Catalog is free. Write for these books today.

Hewitt-Lea-Funck Co. 459 Funck St. Sumner, Wash.
Capital $1,000,000 Not in any trust or combine

C. E. JENNINGS STEERS PATENT EXPANSIVE BIT



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. *Sole Mfrs.* 71-73 Murray St., N. Y.

The word "WHALEBONE" before Wall Ties means a permanent construction when placed.

Don't order Wall Ties from your dealer. Order Whalebone Wall Ties and get the best.



Standard size for solid or veneer walls 7 x ⅞", weighing 50 pounds to the thousand.

If your dealer can't furnish "Whalebone," wire us at our expense the following:

(Name of dealer) can't furnish Whalebone, (Express, Freight) (number) boxes. (Your name).

We will ship the same day from our factory or from the nearest dealer handling the Whalebone and guarantee satisfaction in every respect.

Allegheny Steel Band Co., 886-888 Progress St. Pittsburgh, Pa.

MYERS HYDRO-PNEUMATIC PUMPS

BRING CITY WATER CONVENIENCES TO ALL

A Myers Hydro-Pneumatic Water System is inexpensive and it will give first class service. Both air and water are pumped into the supply tank. The air, after it has become compressed in the top of the tank, drives the water through the service lines. It is not necessary to have an elevated tank and installation is easy. Pumps are made for operation by hand, gasoline engine or other power.

Write to our Service Dept. for catalog and information.



F. E. MYERS & BRO., Ashland, Ohio

ASHLAND PUMP AND HAY TOOL WORKS

HESS MEDICINE SANITARY CABINET LOCKER



The Only Modern, Sanitary STEEL Medicine Cabinet

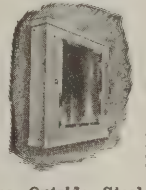
or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



The Recessed Steel Medicine Cabinet — The Outside Steel Cabinet

Send for Illustrated Circular

HESS, 1201-L Tacoma Building, CHICAGO

Makers of Steel Furnaces. Free Booklet

FINISH THE JOB RIGHT

Use The "Ideal Gutter"

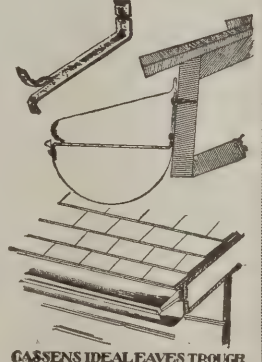
Cassen's Ideal Eaves Trough overcomes the disadvantages of the old-style open gutter. It insures clean, healthful cistern water. It is never clogged.

Have you seen it? If not we want you to try it. If "The Trough with the Lid" doesn't beat anything you have ever seen in the gutter line, tell us and you get your money back.

Write us for full particulars.

CASSENS MFG. CO.

Edwardsville, Ill.



CASSENS IDEAL EAVES TROUGH

PAT. NOV. 13 '06. OTHER PATENTS PENDING.

1/3 SAVED — Buy Direct From MANUFACTURER



FREE BOOK

Do Your Own Plumbing and Heating NEW HARDIN EASY WAY



Get our "Handy-Man" Free Book. Every home needs it. Shows new home improvements and everything in **plumbing and heating supplies** EXCLUSIVELY at wholesale prices—complete heating plants, bathroom outfits, sinks, pipe, fittings, water systems, lighting plants, etc. **Any handy man** can install our goods with this free book and free easy installing plans. $500,000 plants behind our guarantee. **WRITE TODAY.**

The Hardin-Lavin Co. 40 yrs. at 4538-48 Cottage Grove Ave. **Chicago**

but in case the dealer will not order for him or tries to furnish something "just as good," the company will be glad to receive the order direct.

In the review of the little work entitled "A Book About Slate," which appeared in our July issue, it should have been stated that the booklet is the property of the J. E. Bray Slate Co., East Bangor, Pa., and is primarily isued for the purposes of furthering the interests of this concern, which succeeds the firm of J. Bray & Co. Arrangements are being made for an increased business this fall with improved facilities.

Those employees of the Joseph Dixon Crucible Co. who had joined the National Guard prior to its being called by the President and subsequently sworn into the Federal Service in June, 1916, will receive full pay while away doing military duty. These men will have their places kept open for them. This provision holds good until future developments make it necessary to change or modify it.

William A. Gill, formerly vice-president of the Kinnear & Gager Manufacturing Company, Columbus, Ohio, has succeeded the late Edwin B. Gager as president and treasurer of the company. John M. Gleason, manager of the Boston office, will be vice-president and general manager, while A. D. Bierman will continue as secretary and George W. Harlam as assistant treasurer.

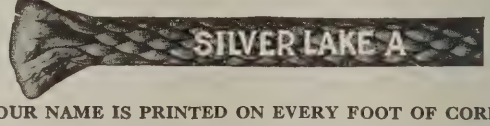
On the 1st of July the corporate name of the Caldwell Auger Bit Company, Lebanon, N. H., was changed to the Lebanon Machine Company, which in the future will manufacture the Lebanon high-speed "Z" twist auger bit and other high-grade wood-boring tools.

In connection with the "Carter Paint Calculator," briefly reviewed in the issue of THE BUILDING AGE for July, the statement should have been made that the little work will be sent without cost to building contractors, architects and painters who may be sufficiently interested to make application for it. The company states that any reader of THE BUILDING AGE who sends an order for the Calculator will receive it with its compliments.

WANTED—A PRACTICAL WRITER

An opportunity is open for a man qualified as a writer who is familiar with practice in plumbing, steamfitting and sheet metal shops and with engineering problems and methods of solution that are met in every day work. Give training, experience and compensation desired. Address "J. P. M.," care Building Age, New York.

SILVER LAKE A SASH CORD

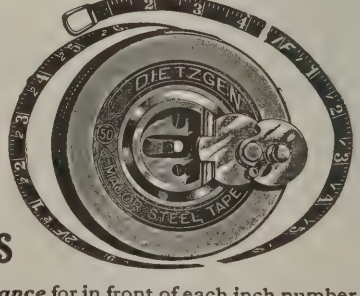


OUR NAME IS PRINTED ON EVERY FOOT OF CORD

SILVER LAKE COMPANY, NEWTONVILLE, MASS.

Speed

when using Measuring Tapes saves *time* and *money* for you.



Dietzgen Tapes

give measurement ***at a glance*** for in front of each inch number the foot number is shown. Cases strongly made—insuring service. Top graduations—convenient to see. **Tape Catalog B Free.**

Eugene Dietzgen Co.

Manufacturers

Measuring Tapes Surveying Instruments Drawing Materials

Chicago New York San Francisco New Orleans Toronto Pittsburgh Philadelphia



The Building Age

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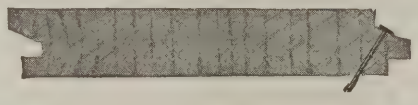
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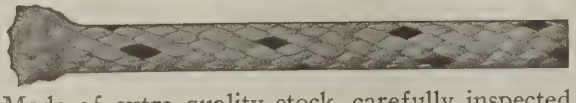
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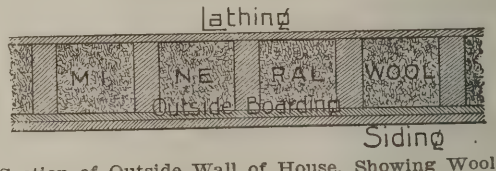
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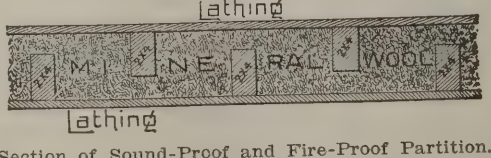
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The Building Age

NEW YORK, SEPTEMBER, 1916

A Frame House at Bayside, New York

Treatment of Exterior Involves Striking Features—Interior Arrangement Out of Ordinary

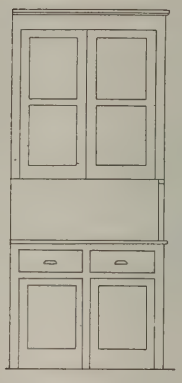
THE home of the suburbanite is usually of such architectural treatment as to command more than passing attention on the part of the architect and builder, and the subject of the comments which follow is no exception to this assertion. The design is unique in its conception and its external treatment involves a long sloping roof which, broken with a double tier of dormer windows, sweeps down over the broad veranda extending across the front and is supported by substantial columns of cylindrical form. There is also at the right a pergola, through which rises partially exposed to view from foundation to cap, a broad, brick chimney. Its mate at the rear appears just above the inclosed sleeping porch which is directly over the "den." These are features which hold the eye of the interested architect and builder when approaching the house from the front, and which



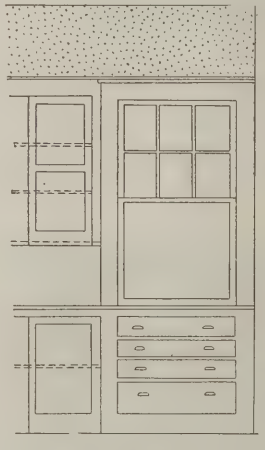
View in the Living Room of the Residence of Mr. Arthur Swann at Bayside, New York



Front Elevation Showing "Den" Extension—Scale 3/32 In. to the Foot



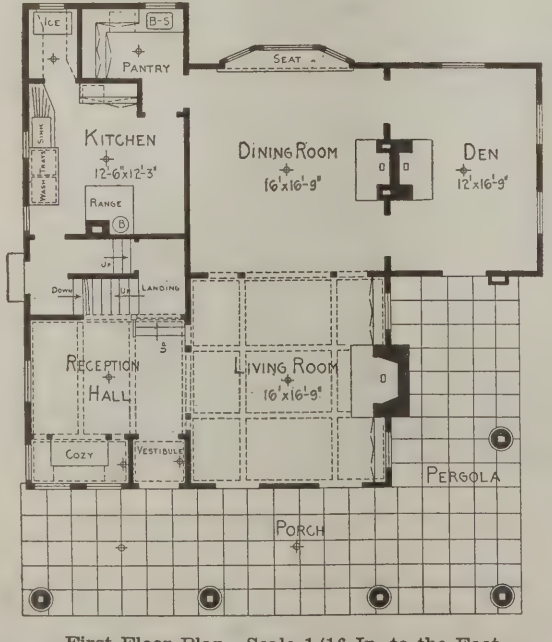
Elevation of Cupboard in the Kitchen—Scale ¼ In. to the Foot



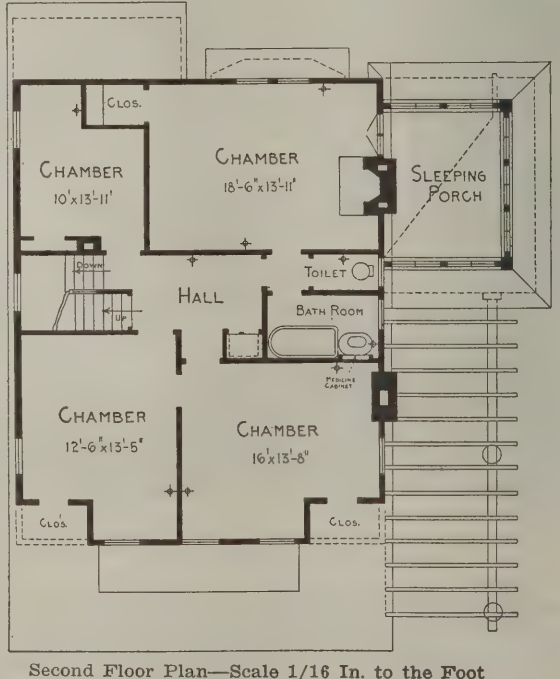
Partial Elevation of Pantry Dresser—Scale ¼ In. to the Foot



Side (Right) Elevation Showing "Den" and Sleeping Porch Windows—Scale 3/32 In. to the Foot



First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot

Plans, Elevations and Details of a Frame House at Bayside, Long Island, N. Y.

give to it an individuality highly creditable to the architect responsible for the conception.

The arrangement of rooms is decidedly out of the ordinary. Leaving the broad porch, the visitor enters from the vestibule into a reception hall practically square in size and having at the front a cozy nook lighted by a double window. The stairs are of the combination type and rise from the reception hall three steps to a broad landing, which is also reached by a similar number of steps from the kitchen hall. From the landing the stairs turn at right angles to the left and bring one to a second broad landing lighted by an outside window, and the flight, then turning to the right, brings one to the hall on the second floor in the center of the house.

At the right of the reception hall and communicating with it through a buttressed opening, is the living room, the striking feature of which is the massive stone fireplace and chimney breast, a view of which is afforded by the picture upon the first page of this article. At the left of the fireplace are seen the bookcases with high window above, and in the background to the left is a glimpse of the dining room with its brick-faced fireplace with "summer piece" in position. Another feature of the living room is its beam ceiling.

Beyond the living room is the dining room with its bay-window and fireplace as already noted. One of the pictures presented herewith represents a view in the dining room looking toward the china closet, and showing through the partially opened casement door, the desk and bookcase in the "Den." At the extreme left is the other door leading into the "Den," while at the extreme right is a glimpse of the fireplace in the living room.

Backing the fireplace in the dining room is another in the "Den," which is at the right of the dining room and communicates with it through casement doors on either side of the fireplace.

The kitchen is located at the rear directly beyond the reception hall and at the left of the dining room with which it communicates through a well-equipped butler's pantry. The kitchen has a separate chimney for the range, and the wash trays and sink are placed under one of the side windows where they receive ample light. The refrigerator occupies a space directly off the kitchen and is lighted by an outside window.

There is an entrance to the kitchen at grade and from it the cellar is reached by a flight of stairs directly under the main flight to the second floor.

In the second story are four sleeping rooms and bathroom. A feature worthy of special mention in this connection is the separate toilet which immediately adjoins the bathroom. The sleeping room at the rear has an open fireplace and it is from this chamber that the sleeping porch is reached through double casement doors. Each sleeping room has a commodious clothes closet and in the hall near the bathroom door is a linen closet.



A Frame House at Bayside, Long Island, N. Y.—Architect George J. Hardway, New York City

The foundation walls of the house are of concrete, composed of one part cement and five parts coarse gravel and sharp sand. The cellar has a floor of concrete 4 in. thick. The chimneys are built of hard-burned brick set in lime and cement mortar. The flues have terra cotta lining extending from the bottom to the top.

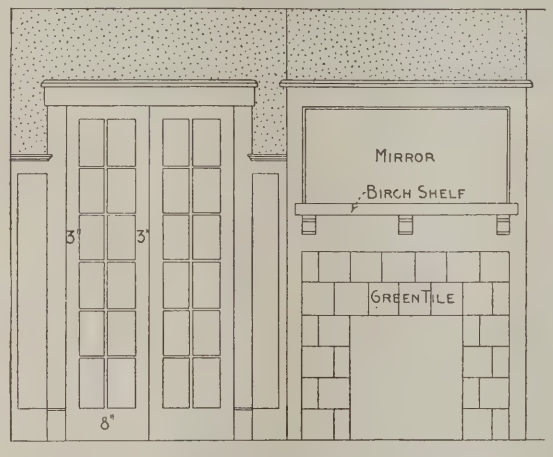
The floor of the front porch, or as it may be more strictly termed "veranda," is of concrete 4 in. thick, resting on a cinder base, with a 1-in. layer of Portland cement as a top dressing.

Of the framing members, the sills are 4 x 6 in.

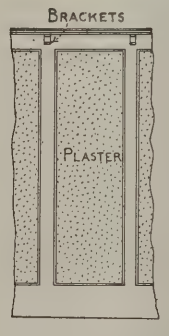
with girder 6 x 6 in. The sills are halved and spiked together at the corners and supported on Acme columns with iron caps and bases. The first and second floor joists are 2 x 10 in. and those of the third floor 2 x 8 in., all spaced 16-in. on centers. They are doubled under partitions and around openings for stairs, chimneys, etc., and with headers and trimmers hung in stirrup irons. The studs and plates are 2 x 4 in. and the rafters 2 x 6 in., also spaced 16 in. on centers. The floor joists of the porch decks are 2 x 8 in., spaced 16 in. on centers. All framing is diagonally braced with 2 x 4-in.

tion of the kitchen and the pantry are double. The sub-floor consists of ⅞ x 6-in. spruce boards, laid diagonally, over which is a finish floor of oak parquetry. The floors of the kitchen and pantry are ⅞ x 2½-in. matched maple. The floors of the second story are of ⅞ x 2½-in. face edge-grain North Carolina pine, while the floor of the third story is 4-in. North Carolina pine.

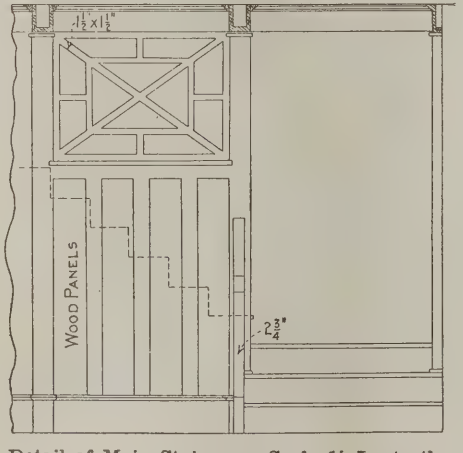
The finish of the living room, reception hall and stairs is of ⅞ x 4¾-in. oak, with molded cap. The dining room is finished in birch treated in imitation of mahogany. The finish of the kitchen is of



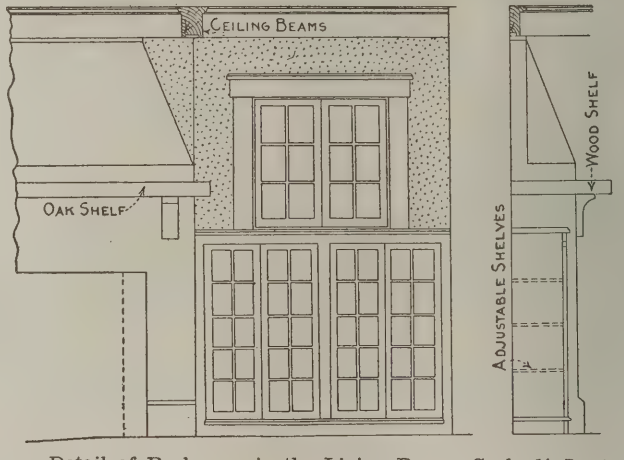
Elevation of Casement Doors and Open Fireplace in the Dining Room—Scale ¼ In. to the Foot



Detail of Wainscoting in the Dining Room—Scale ¼ In. to the Foot



Detail of Main Staircase—Scale ¼ In. to the Foot



Detail of Bookcases in the Living Room—Scale ¼ In. to the Foot

Miscellaneous Constructive Details of a Frame House at Bayside, Long Island, N. Y.

pieces cut in between studs, and floor joists are braced with 1⅛ x 2-in. herringbone bridging.

The exterior framing is covered with ⅞ x 8 -in. matched and surfaced spruce boards laid diagonally, over which are 22-in. cedar shingles exposed 9 in. to the weather.

All roofs are covered with 16-in. cedar shingles exposed 4 in. to the weather.

All outside finish, corner boards, casings, moldings, exposed rafters, pergola members, etc., are of No. 1 cypress. The porch ceilings are laid with cypress ceiling strips having 2½-in. face. The porch columns are of the lock-joint type, made by the Hartmann-Sanders Co., Chicago, Ill.

The floors of the first-story rooms with the exceptcypress, and the same material is used for the finish of the third story.

The doors, with the exception of the front entrance are 1¾ in. thick and of the five cross-panel type. The window sashes are of white pine 1⅜ in. thick and the French windows are 1¾ in., rabbetted and hinged at the side.

All exterior woodwork received a priming coat and then two coats of white lead and oil paint. The ceiling of the porch was finished with a coat of bleached shellac and two coats of varnish. The front door was finished with spar varnish.

The shingles of the roof and the sides of the house were dipped in Cabot's silver gray shingle stain and afterward received a brush coat. All interior trim

received four coats of pure flat white finish. The white wood and birch were fumed and stained mahogany, and then given three coats of rubbing varnish, which was finished with pumice stone and water. The white cement tile of the bathroom was given three coats of "Superior" white enamel, over one coat of flat "Jap-a-Lac." The exterior of the bath tub was finished in the same manner.

The bathroom equipment consists of modern plumbing fixtures, the lavatory being of oval pedestal style, 22 x 33 in. in size and of enameled iron. The tub is of the rolled rim iron enameled type, 5½ ft. in length and provided with claw feet. The toilet immediately adjoining the bathroom has a syphon water-closet of vitreous china with mahoganized birch seat and cover. The servants' bathroom on the third floor is fitted with a 4 ft. 6-in. enameled iron tub and an enameled iron washstand measuring 18 x 20 in. The water-closet is of the same style as that already mentioned. In the basement is a wash-down water-closet with an oak seat and cover.

The sink in the kitchen is of enameled iron with flat rim and measures 20 x 30 in. in size.

The house is heated by a hot-water system with bronzed radiators, the boiler used being of the Richardson & Boynton make. All pipes supplying radiators above the first floor are run in partitions and are covered with heavy asbestos. The boiler and all basement pipes have magnesia covering.

Water and gas pipes were carried in from the street 5 ft. below grade. A main shut-off for water is located just inside the front wall of the house in the basement and from this are carried ¾-in. galvanized iron water pipes to supply cold water to all fixtures as well as to the heater and laundry stove. A sill cock is provided at the front and rear of the house with a shut-off in the basement.

The attractive suburban home here illustrated and described is known as "Greenwood Lodge" and was built for Arthur Swann, Odell Avenue, Bayside, Long Island, N. Y., in accordance with plans prepared by Architect George J. Hardway, 347 Fifth Avenue, New York City.



A Frame House at Bayside, Long Island, N. Y.—View in Dining Room Looking Toward the "Den" with the Living Room at Right

Decorative and Enduring Qualities of Cypress

A wood that is beautiful, workable and lasting is sure to be valued by architects, carpenters, and cabinet-makers, for these three qualities are not always found combined. Such a wood as this is cypress—hence its wide renown and popularity to-day. Yet there are still many home-makers who are not familiar with all of its virtues, and a few words upon the nature and usefulness of this adaptable material may prove of timely interest to those who contemplate the building or remodeling of a home.

Cypress should not be used indiscriminately; it need not be employed where cheaper woods might acceptably serve. Yet it is coming more and more to be chosen in places where "good enough" lumber is not so much the object as permanent investment value. For cypress adds so definitely to the value of a structure that builders prefer it for many purposes in place of other woods.

If one does not wish to use it solid, one can employ it as a sort of preserving veneer for the interior trim, shutting out from woods that are less durable the elements of destruction and safeguard-

ing them from decay. Likewise applying the "exterior veneer" principle, every builder may insure his work against rot and other forms of deterioration by "veneering" the house with cypress—which means using it for all outside woodwork. It is the exposed woodwork that bears the brunt of the attack, and the wise general masses his greatest defensive forces at the exposed posts.

The safety of the building, however, is not assured by using cypress for this purpose only. There are other places that should be guarded. The chief one is where the frame structure joins the foundation—the sills or bearing plates. These rest on the cold, damp material of which the foundation is made. They serve as the super-foundation of a frame building.

Weight of Building Carried on the Sills

The entire weight of the building is carried by these sills. There are many points of contact between the sills and the studding, each one of which is a point of attack for destroying fungi, says Arthur S. Devose in a recent issue of *The Craftsman*. The foundation usually transmits the necessary moisture to feed the fungi, and the result is deterioration, slow at first, but more rapid as the destroying agent strengthens its hold.

Destruction of wood at this point is commonly attributed to "dry-rot"—a somewhat misleading term, for utter absence of moisture or complete submersion in it renders wood impervious to decay. Certain wood-destroying fungi thrive with a minimum of moisture and where they secure a foothold "dry-rot" is said to have set in. Cypress is relatively impervious to rot influences, and for this reason is recommended by its historic achievements for duty at all exposed points.

The extra cost of the absolutely necessary quantity of cypress for a house—its cost being somewhat higher than many woods—is almost negligible. If cypress is specified and included in the estimate, it means usually only a slight difference in price, sometimes none at all. Here are actual figures:

Amount Required for the Sills

Take an ordinary house with, say, 150 ft. of outer wall. Using one piece of 2 x 12 and one piece of 2 x 10 for a box sill, it would require 550 ft. of lumber for the sills. If it was necessary to pay as much as $20 a thousand feet more for the cypress, the cost of the whole building would be increased only $11. Surely that is a very small premium to pay for insurance against the necessity of putting in a new super-foundation for the entire structure, repair work that would cost several hundred dollars plus untold inconvenience.

Thousands of builders, however, have begun to use cypress for exterior woodwork as a matter of economy. They consider it the best investment they can make. For interior woodwork it meets with greater competition, as many other woods will give ample length of service where not exposed to weather. But the advent of the "sugi" finish, which gives the world-famous Japanese "driftwood" effects, has added to the natural virtues and interesting grain of cypress the possibility of strikingly decorative beauty. This is secured in a simple manner. The surface of the wood to which it is to be applied is charred with a gasoline torch and the charred portions brushed away with a steel brush.

Cypress is being used, moreover, in increasingly large quantities for greenhouses; in fact, it has almost a monopoly of that trade. It is also becoming popular for pergolas, sleeping porches, rustic siding, arbors, trellises and other uses where the wood is exposed to alternate extremes of temperature and moisture. For such purposes its rot-proof qualities have made it the general favorite.

Working Unit Stress for Structural Timbers

This table gives working unit stresses for structural timbers used in dry locations, and is compiled in the main from material furnished by the Forest Products Laboratory, Madison, Wis. Other values of unit stresses for use in the various formulas will be found in the same table. The unit bending stress may be taken from the table, according to the kind of timber used.

Working Unit Stresses for Structural Timbers Used in Dry Locations

Species of Timber	Bending		Compression	
	Stress in Extreme Fibre, Lbs. Sq. In.	Horizontal Shear Stress, Lbs. Sq. In.	Parallel to Grain "Short Columns," Lbs. Sq. In.	Perpendicular to Grain, Lbs. Sq. In.
*Fir, Douglas				
Dense grade	1,600	100	1,200	350
Sound grade	1,300	85	900	300
Hemlock, Eastern	1,000	70	700	300
Hemlock, Western	1,300	75	900	300
Oak	1,400	125	900	400
Pine, Eastern White	900	80	700	250
Pine, Norway	1,100	85	800	300
*Pine, Southern yellow				
Dense grade	1,600	125	1,200	350
Sound grade	1,300	85	900	300
Spruce	900	70	600	200
Tamarack	1,200	95	900	350

*The safe working stresses given in this table are for timbers with defects limited according to the sections on defects in the rules of the Southern Pine Association for Select Structural Material. "Dense" Southern yellow pine and "dense" Douglas Fir should also conform to the other requirements of this rule. "Sound" Southern yellow pine and "sound Douglas fir require no additional qualifications, whereas the other species should, in addition to being graded for defects, have all pieces of exceptionally low density for the species excluded.

Cottages of Reinforced Concrete Built in Four Hours

Attractive summer cottages of reinforced concrete are being constructed so rapidly on the shore of Lake Erie, near Cleveland, Ohio, that approximately only four hours are said to be required to erect one. Steel faced "forms," which can be quickly put up or taken down, are used for the foundation, floor, walls, partitions and roof, which are of "poured" concrete construction. The concrete is discharged into these "forms" from the mixer by means of an inclined adjustable trough, the aggregate being conveyed up the trough by metal paddles arranged endless-chain fashion and then is chuted through a spout to the point required. After the forms are removed, the interior surface is smoothed and subsequently painted.

The cottages are one story in height and occupy an area of 35 ft. in length by 21 ft. in width. The walls are 4 in. thick and the ceilings are 9 ft. high. A flat parapetted roof is covered with earth which serves as an insulator against the heat of the sun.

The floor plan of each home provides for a large living room so arranged that it may be subdivided should necessity arise; a bed chamber, kitchen and toilet room.

A "Field House" and Comfort Station

A Design Well Adapted for a Small Park—Details of Construction with Reference to the Plumbing

THROUGH the activities of Park Commissioners in many Middle Western cities the small parks, squares and triangles under their jurisdiction have been improved by the erection of inexpensive comfort stations, the providing of sanitary facilities for men and women being a distinct benefit to the public and reflecting no little credit on the designers. Buildings of this character combine features of interest to the builder, and a knowledge of the requirements should be of material assistance to the individual in the preparation of plans and specifications. The presentation of the following data is an opportunity for the progressive contractor to bring before the proper authorities in his home city the advantages and low cost of erecting similar buildings wherever needed.

The Park Commissioners of Herrington's Island Park in Geneva, Ill., a town of 2500 population, have recently completed the construction of a field house and comfort station on the banks of the beautiful Fox River, the work being an interesting example of what the contractor in the country town is called upon to execute for a sum approximating $5,500. The location of the building was an additional inducement for the architect to design a structure that would enable visitors to obtain a splendid view of the surroundings and enjoy the cool breezes in summer, besides providing a structure that would be a shelter against rain storms and a convenient place where meetings may be held. Should firework displays be held at any time there is little danger of fire, as asphalt shingles have been used in covering the roof.

The subject of this article is an attractive one-story building designed along conservative architectural lines and including many interesting constructive features. In the first picture there is presented a general view of the west and south sides of the building taken from the bank of the river. The exterior treatment involves the use of face brick and stucco which harmonize with the asphalt shingles. The architectural lines are enhanced by the dormers on the east and west sides. A wide terrace having three arched openings gives access to a spacious loggia. On the south side is the entrance to the boys' toilet rooms, the door being concealed by the outer walls. In the third picture the rear of the building is shown. At the extreme left are seen a number of barricades resting against the terrace. These were provided by the contractor

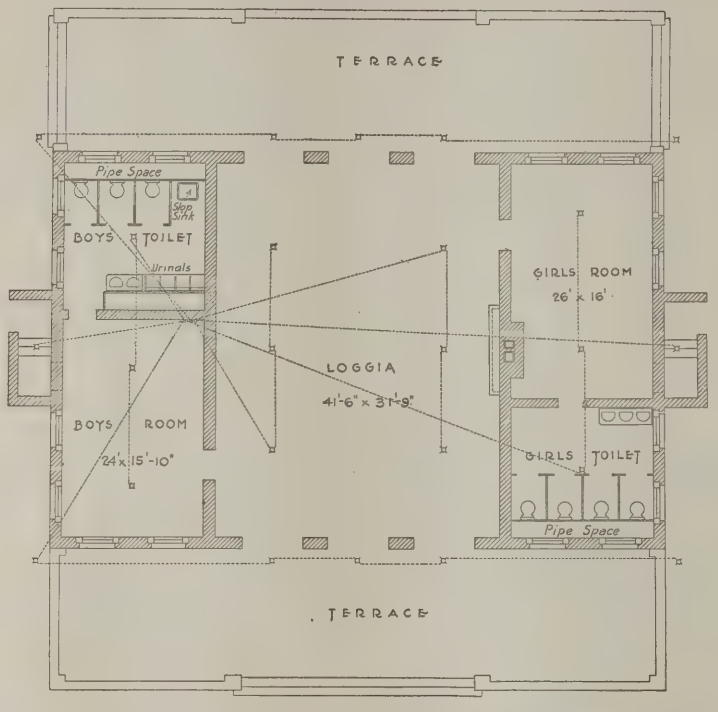


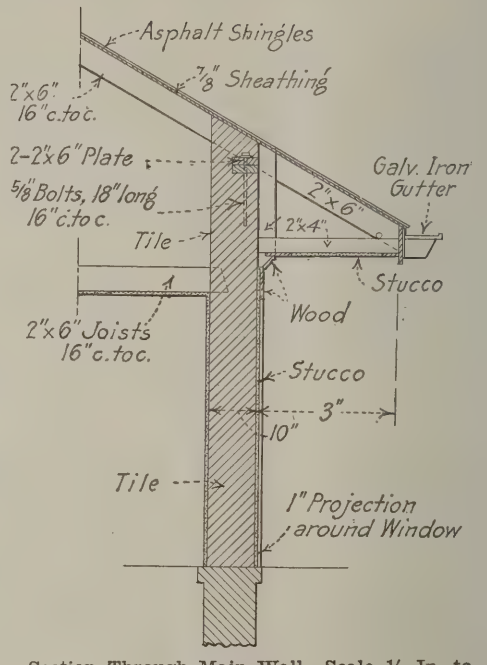
Fig. 1—Photographic Perspective View Showing Front and Side of the Building

for use in winter for closing the entrances to the loggia. They are of light construction, made of plank, and may be stored during the summer.

The second picture illustrates a detail view of the front terrace, the wall of which has been arranged so that ornamental urns may be placed at convenient points. The windows light the boys' and girls' toilet rooms, the entrance to the latter from the loggia being revealed through one of the arched openings. The fourth picture shows a general view of the loggia looking toward the front terrace and the river beyond. On the right side will be observed a large fireplace, which is useful besides being ornamental. It is brought into commission during the cooler evenings and especially for marshmallow bakes and other summer diversions of this character. This picture also presents an idea of the roof construction, showing the rafters and the belly-rod truss beneath the dormer. The door to the left of the fireplace leads to the girls' toilet room. The closet compartments in this section are shown in the fifth picture presented in this article.

The building, including the terraces, is 68 ft. wide and 75 ft. 6 in. long, and the distance from the finished grade to the apex of the roof is 30 ft. The terraces on either side run the full width of the building and are 14 ft. wide. They are joined by a loggia 41 ft. long by 31 ft. 8 in. wide, the loggia

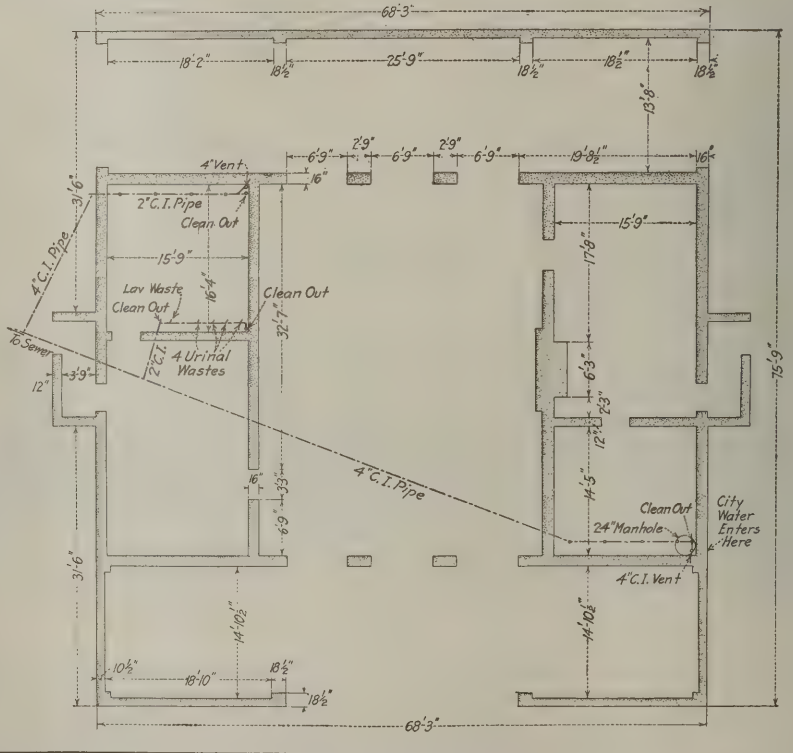




Section Through Main Wall—Scale ¼ In. to the Foot

The floor plan (above) shows the position of the rooms for boys and girls, also the respective toilet rooms equipped with modern plumbing fixtures. The relation of the several rooms to the loggia is also clearly indicated.

The foundation plan to the right shows various measurements and the run of the soil pipe—Scale 3/64 in. to the foot.



A "Field House" and Comfort Station—Plans and Detail

being so arranged that the summer breezes will sweep through to the far terrace from off the river.

Running parallel with and on either side of the loggia are the boys' and girls' toilet rooms, the arrangement in each case consisting of a large outer room and a smaller toilet room. The sections housing the plumbing fixtures measure 16 ft. square, while the outer rooms measure approximately 16 ft. wide by 28 ft. long.

Access to the toilet rooms is made possible from either the loggia or the exterior of the building, the outside entrances being concealed by brick walls. A stone slab built into each wall denotes whether it is the girls' or the boys' section. Each room is lighted by four windows, four to each side of the building, making sixteen windows in all. The equipment in the girls' toilet room consists of four closets and three lavatories, while the boys are provided with four urinals, three closets and two lavatories, as well as a slop sink.



A "Field House" and Comfort Station Fig. 2—A Detail of the Front Terrace

All foundation walls and piers are of concrete, consisting of one part Portland cement and six parts gravel of medium size, with footings 1 ft. 4 in. The exterior surfaces of all walls above grade and above the finished floor lines are troweled smooth with cement plaster.

The floor of the building and terraces is of concrete 4 in. thick, resting on a 6-in. bed of cinders. A cement base is built around the loggia and cement steps for the terraces and exterior toilet entrances. The proportions of the aggregate for concrete are the same as those in the foundation work. The floors in the toilet rooms and their communicating steps have a ¾-in. cement finish, composed of one part Portland cement and two parts sand. The cement floors of the loggia, the terraces and terrace steps have a ¾-in. finish of one part Portland cement, two parts coarse sand and 5 lb. of master builders' red concrete hardener to every bag of cement. This hardener was used to reduce the glare of the finished concrete and also to harmonize with the face brick work. The aggregate was thoroughly mixed until uniform in color, sufficient water being added to thoroughly saturate the mixture. For the finish a dry mixture consisting of one part master builders' red concrete hardener and one part Portland cement was mixed to an even color and sprinkled evenly over the surface. This was floated in thoroughly and well troweled. A second troweling was given the surface after it had set sufficiently to finish hard and smooth. For safeguarding the floor, it was specified that after the top surface had set the contractor cover it with a uniform layer of non-staining soft wood sawdust or shavings. This was not applied until experiment showed the surface hard enough to prevent the covering from scratching or injuring the finish. The surface was kept wet for no less than five days.

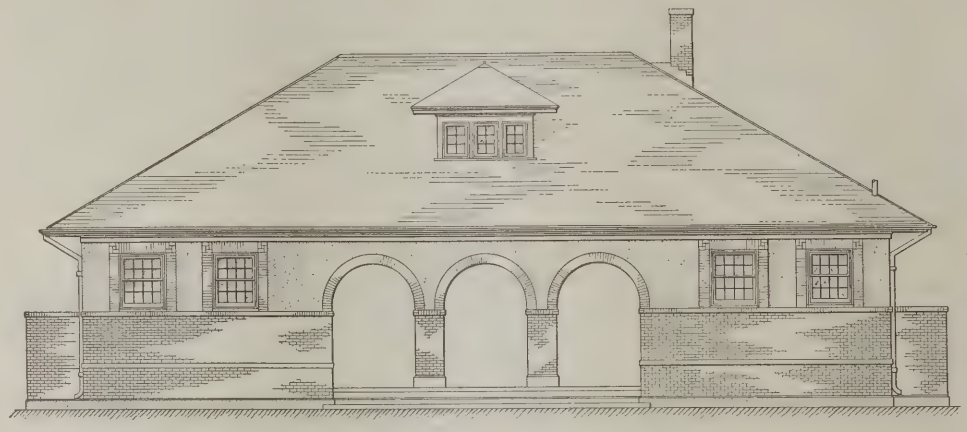
The terrace floors are graded to a 4-in. pitch and brick drips are provided in the terrace walls. Stone was used throughout for the terrace copings and for the 5-in. fireplace mantel.

All brick walls backing up face brick and interior brick walls in the toilet rooms are built of first quality hard burned common Illinois brick, with struck joints. The bricks are laid in solid joints of tempered lime mortar, every seventh course being a header course.

The exterior surfaces of all walls, the fireplace, the chimney above the roof and all loggia walls are

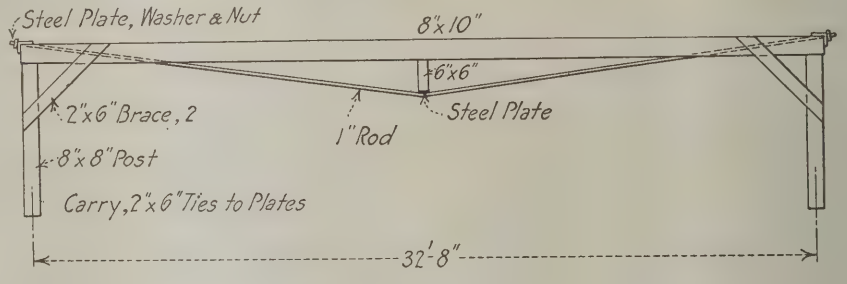
finished with a rough face, wire cut Arcadians mixture brick, all face brick being laid in regular bond with ⅜-in. uniform raked black joint. Face brick is used for the copings on the walls concealing the toilet entrances. The face brick walls are extended to a height of 8 ft., above which point are hollow tile and stucco work. The outside brick walls are 13 in. thick. Window sills inside and out are course is carried inside and out, with stucco on common brick between.

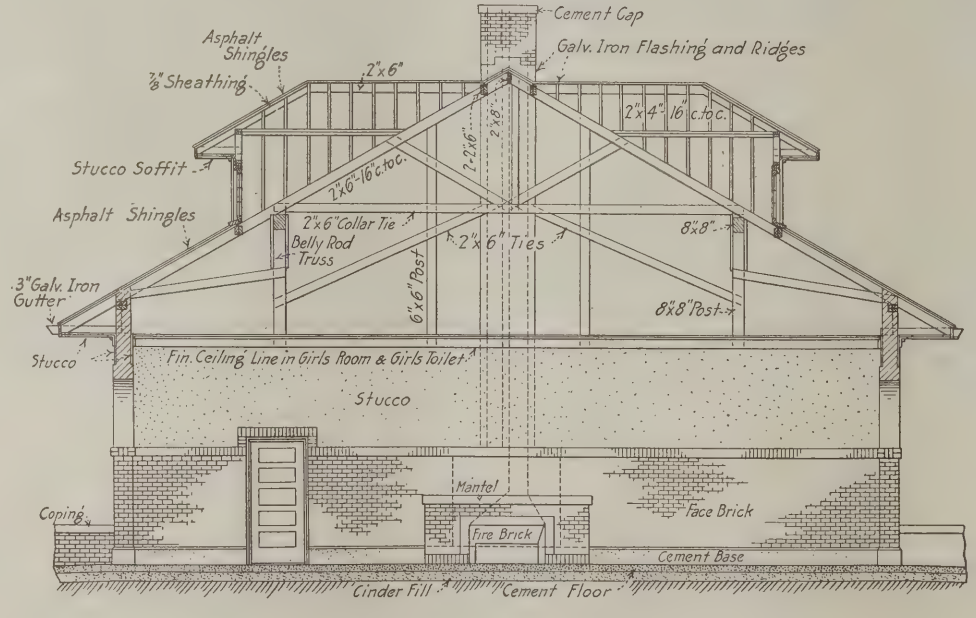
The walls above the brick work are of 12 in. "Natco" hollow tile, laid in tempered mortar. The partition walls between the outer and inner toilet rooms are 8 in. thick and built of hollow tile. The ceilings of the toilet rooms and the soffits of the building and dormers are covered with expanded



To the Left a Front View of the Building Showing Triple Arched Entrance—Scale 1/16 In. to the Foot

To the Right is a Detail of One of the Belly Rod Trusses Used in the Roof Construction Scale ⅛ In. to the Foot





To the Left a Vertical Cross-Section of the Building Showing the Construction of the Roof — Scale 3/32 In. to the Foot

A "Field House" and Comfort Station—Elevations and a Detail of the Roof Truss

built of brick. The edge of the roof extends 3 ft. beyond the exterior walls.

The chimney and fireplace are of face brick, and the flues are lined with cement plaster. The chimney is capped with 5 in. of cement and is lined and floored with firebrick laid in fire clay. The fireplace is 10 ft. wide and 4 ft. high.

The inner circle of the arched openings is 3 ft. 6 in. in diameter, over which a face brick soldier metal lath. Six inches of stucco is provided above the brickwork over the windows. The ceilings and soffits and all walls outside and inside above face brick are plastered two coat work.

The plates in the hollow tile wall are 2 x 6 in. and the bolts are ⅝ in., 18 in. long, and placed 10 ft. on centers. The rafters are 2 x 6 in., placed 16 in. on centers, with braces and collar ties. The four hip rafters are 2 x 10 in. and the ridge is 2 x 8

in. The collar ties spanning the width of the building above the belly-rod trusses are 2 x 6 in. The 7/8 x 6 in. ties shown in the sectional elevation are nailed to every fourth rafter. Dormer rafters are 2 x 4 in., placed 16 in. on centers.

In the attic space over the toilet rooms are two 6 x 6 in. posts supporting the hip rafters, placed 8 ft. apart, the posts extending to a height of 12 ft. above the finished ceiling line of the toilet rooms. These posts are also 8 ft. distant from the 8 x 8 in. posts forming part of the belly-rod trusses.

The belly-rod trusses extend the entire width of the loggia beneath the dormers and are 32 ft. 8 in.



Fig. 3—Rear View of the Building



Fig. 4—View in Loggia Looking Toward the Front Terrace with the River Beyond

built of 7/8-in. M & V pine, the doors being of the same material.

All exterior woodwork received two coats of white paint after priming. The surfaces of sheet metal work, plumbing pipes and window gratings have one coat of zinc white mineral paint mixed with boiled linseed oil and two coats of white lead paint. The pulley stiles received one coat of boiled linseed oil when the frames were primed and one coat when the finish was applied. All interior doors, sash, toilet partitions, etc., have two coats of white lead paint.

The closet compartments are 4 ft. wide, 5 ft. long and 6 ft. high. Connections for water supply are made with the city water main about 50 ft. northeast of the building. A 2-in. galvanized iron pipe is run to a 24-in. manhole in a corner of the girls' toilet room, where the piping and valves are exposed. From the 2-in. water main proper connections are made to the various fixtures. All plumbing fixtures are of types made by the Standard Sanitary Mfg. Co., Pittsburgh, Pa.

The lavatories are equipped with self-closing



Fig. 5—Closet Compartments in the Girls' Toilet Room

A "Field House" and Comfort Station—Various Pictures of Interest to the Builder

long. The 8 x 8 in. posts at either end are joined by an 8 x 10 in. beam securely braced at each end with two 2 x 6 in. pieces, the 2 x 6 in. ties being carried to the wall plates. The distance between the 8 x 10 and the low point of the 1 in. belly-rod is 18 in., and this is reinforced by a 6 x 6 securely fastened to the rod by a steel plate. Where the rod joins the truss at the top of the posts it is securely held in place by a steel plate equipped with washers and nuts.

The roof is sheathed with 7/8 x 6 in. No. 2 pine boards laid close together, which, with the dormers, are covered with Barrett's "Tyle-Like" slate colored asphalt shingles exposed 4 in. to the weather.

The doors throughout the building are of types made by the Curtis Door & Sash Co., Chicago, Ill. The outside toilet doors measure 3 x 7 ft. x 1¼ in., and the closet compartment doors are 7/8 in. thick, of the same length and width. Toilet partitions are

nickel-plated faucets. The urinal stalls are built of slate and the urinals are operated by an intermittent self-operating tank. The closets are equipped with galvanized iron low-down tanks, painted white, and seats which automatically flush the bowl when released after use.

The soil and waste pipes are of extra heavy cast iron with hub joints. The plumbing system is vented and revented, as shown on the accompanying floor plans. The water closets and urinals have 4-in. wastes and the rest of the fixtures 2-in. wastes. The vent stacks continued through the roof are flashed and covered with sheet lead, leaving an air space between the lead and the cast-iron pipe.

The wastes from the building are carried through a 4-in. cast-iron main to a heavy concrete catch-basin located near the building. From the catch-basin a vitrified tile sewer makes connection to the city septic tank.

The building is wired for electric lighting in accordance with the rules of the Board of Fire Underwriters.

The plans and specifications of the building were prepared by Frank B. Gray, 1251 Otis Building, Chicago, Ill., who places the cost of the structure at $5,445. The general contractors executing the work were Wilson Bros. of Geneva, Ill.

Liquids for Use in the Drafting Room

A liquid may be obtained which enables blue print copies to be made of letters, printed pages from books, heavier grades of tissue drawings, etc. It may be applied to many articles of this kind from which blue print copies could not otherwise be made, as the application renders them transparent, without in any way damaging the article itself, beyond a slight coloring and stiffening of the paper. If this is objectionable it may be removed by applying gasolene to the paper. This cuts out the oil left by the liquid, and restores the article to its original condition.

The application of this non-inflammable compound to pencil drawings on cloth or paper will render these drawing materials transparent, and blue prints may be made in electric frames at the same speed as from ink tracings. This eliminates the old pencil lay-out and reduces the cost of labor and material in preparing drawings from 30 per cent to 50 per cent, depending upon the extent to which the idea is carried out. Brief directions for the preparation of these direct pencil drawings are given below.

(a) Drawings on cloth or paper should be made with the "HB" or "2-H" grade of pencils, the former for the heavy view lines and shading and the latter for the finer and dimension lines.

(b) The drawing when completed should be laid face down on a clean table and the liquid applied by a brush which will transparentize the drawing and grip the pencil lines. The drawing should then be thoroughly coated on face side and dried between blotters; care should be taken to see that any excess solution is blotted from the surfaces.

(c) The solution protects the drawing from smudging of the pencil lines and successful erasing of any considerable portion of the drawing can only be done with benzine and a soft cloth. When new views are laid in on such cleaned portions, the solution should be applied to both sides of the drawing, the same as the original application.

(d) The completed drawings may be handled the same as ink tracings and blue printed at the same speed but are more durable for records as they are water-proof and do not wrinkle.

As regards the transparentizing solution. It has no objectionable odor; does not evaporate after application; does not require heating before application; will have no deteriorating effect on cloth, paper or any materials to which it may be applied. It is entirely safe to handle, is not gummy and does not require the addition of alcohol or similar materials from time to time to prevent gumming.

In addition to its use as outlined above it is indispensable in the drawing room for the following named purposes.

Old or soiled tracings may be thoroughly cleaned and transparentized by applying this solution to both sides with a soft cloth and drying with blotters or cloth.

Sepia negative prints on cloth or paper, and black or brown line positive prints from Sepias, may be transparentized and blue prints secured in the same time as required for making prints from ink tracings.

Printed or typewritten matter, either original or carbon copies may be transparentized and blue prints secured at the same speed as from ink tracings, which makes it invaluable for the preparation of specifications, which it is desirable to produce in blue print form.

The liquid may be applied to tracings damaged by water and the difficulty in securing prints from such tracings may be overcome.

Another useful article to a drafting room may be secured in the way of a liquid to repair holes in tracing cloth. It will repair any torn spots, and will cause holes almost ¼ in. in diameter to entirely disappear from the tracing, by forming a coating where the hole formerly was. Ink may be used directly over the hole or on any of the repaired spots without danger of spreading over the cloth.

A number of concerns now manufacture liquids which will remove all errors from tracings. These solutions will not rot the cloth nor cause the same to deteriorate, but leave the surface of the cloth in its original condition. Directions as follows:

Saturate a small soft clean rag with a few drops and apply to the lines to be erased by a gentle rapid rubbing until the erasure is complete. Then with a dry clean rag apply benzine until all traces of the ink are gone. Never rub hard or use a hard cloth.

Stains from fruit, coffee, etc., may also be removed from paper, clothing or fingers by one of these solutions.

Suggestions for Treatment of Interiors

In the issues of the paper since May we have presented each month four pages of well-executed engravings carrying suggestions for modern door and doorway treatment, together with designs of lighting fixtures and door hardware appropriate to the present tendency in these lines.

In the present issue and beginning on the facing page we show a series of excellent interiors with varied styles of finish all calculated to prove of suggestive value to the architect, the builder and the interior decorator.

The series includes dining rooms, living rooms and staircase hall, the treatment in some instances representing the very latest vogue in this line.

On the fourth page of the series are two views of an impressive entrance of a country home in one of the boroughs of Greater New York. The treatment about the doors is especially noticeable.

The old brick walls of a building which is being converted into a theater in Oakland, Cal., have been perforated by hammer and chisel, the little cavities thus made being intended to serve as a binder for the stucco surface.



An Interior View of a Living Room Showing Its Open Fireplace with Gas Logs and the Lighting of the Room by Means of Triple Windows



Suggestions for Treatment of Interiors—Dining Room Showing Latest Scheme of Paneled Walls



A More Simple Scheme of Interior Treatment of Living Room with a Suggestion of the Stair Hall at the Right and the Cased Opening Leading to the Dining Room at the Left



Suggestions for the Treatment of Interiors—A Dining Room Which Represents the Results of a Careful Study in Harmonizing Effects



Suggestions for the Treatment of Interiors—A Main Entrance and Stair Hall



Front and Perspective Views of an Impressive Entrance to a Country Home at Kew Gardens, New York—The Treatment Surrounding the Door is Especially Effective

The Steel Square and Roof Framing

A Method Which May Be Regarded as an Excellent Key to the Use of the Steel Square

By C. J. M.

So much has been said and written on this subject that it would seem superfluous to discuss the matter further; but there are a few points on which additional comment may not be considered out of place. It is generally conceded that the steel square is a handy instrument to use in cutting the frame work of a roof, and especially if one has first learned how to cut the frame without it. How were all the roof frames cut before the steel square was invented? Everyone knows that there were many roofs framed before that time, and some of them at least show that the work was well done. There were certainly good roof framers in the days of our grandfathers who had some sure method of performing the work which they were called on to do.

Instead of putting the steel square stumbling block in the way of the young carpenter, why not teach him the old method of doing the work? Instead of telling him that the length of the common rafter on the blade and the run on the tongue gives the mark for the cut of jack rafters to fit against a hip or valley rafter, why not teach the young man how to make a plumb miter cut on a raking piece of timber, for that is exactly what it is?

Now as to those old methods of roof framing, I expect the present-day carpenters have been puzzling their brains so much with the figures for the cuts on the steel square that they have forgotten all about them, simple as they are. Now, the steel square is a capital instrument for those who know how to use it and know why they take certain figures on the blade and tongue to obtain certain cuts. I have met very few who possess this knowledge, although I have known a man who could cut the frame of the most complicated roof and have all his lengths and cuts correct without such a thing as a steel square in his "kit," although he was far from being ignorant of its uses. The methods used by this man are simple and easy to understand, and may be shown clearly within the limits of a drawing board 18 x 24 in. in size. As this method is the very best key to the use of the steel square, it may be interesting to the young readers of The Building Age. I will therefore present drawings illustrative of these methods as I learned them and by practice proved them to be correct.

Referring to Fig. 1, *A-B-C-D* represents a drawing board 18 in. wide and 24 in. long. I may say here, however, that there is no particular reason for having a board exactly this size, as its dimensions have no bearing on the work to be done, so that any board or number of boards put together for the occasion will serve the purpose so long as it is large enough and smooth enough to lay out the lines correctly. Now, suppose we have an L-shaped roof to frame with the ends hipped. The portion forming the "L" is considerably narrower than the main portion of the building, this making it necessary to use six hip rafters and one valley rafter, as shown in Fig. 2, which represents a plan of the roof. It makes no difference what may be the length or width of the roof—all that is necessary for our purpose is to know the rise of the roof per foot run.

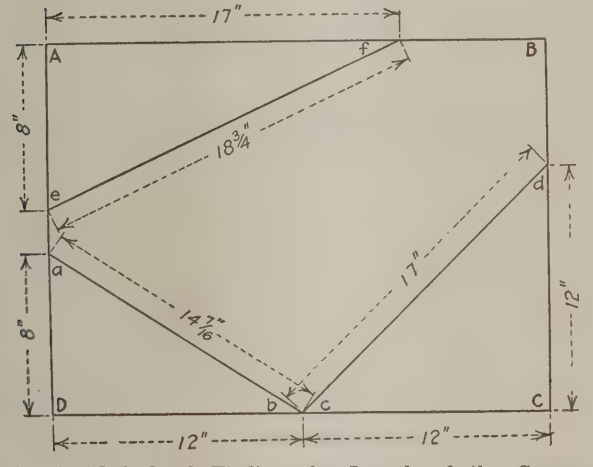


Fig. 1—Method of Finding the Length of the Common and Hip or Valley Rafters

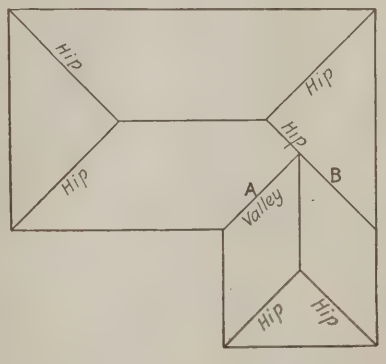


Fig. 2—Diagram of Roof with Six Hips and One Valley

The Steel Square and Roof Framing—By "J. C. M."

Again referring to Fig. 1, we have the triangle *a-b-D*, of which the side *D-b* (12 in.) represents 1 ft. of run and the side *D-a* (8 in.) the rise for 1 ft. of run. The side *a-b* (14 7/16 in.) represents the length of the rafter for each foot of run; and we know if we multiply 14 7/16 in. by the number of feet in the run of the rafter, or half the width of the roof, we will get the length of the rafter from the outside of the wall to the center of the ridge. If there are odd inches in the run add a fraction of the 14 7/16 in, corresponding to the fraction of a foot contained in the odd inches. For example, if

the run be 10 ft. 8 in., or 10 2/3 ft., multiply 14 7/16 by 10 and add two-thirds of 14 7/16 in., which may be easily obtained by dividing the line *a-b* of Fig. 1 into three equal parts, using a pair of dividers. The equivalent of any fraction of a foot may be obtained in this way.

For obtaining the plumb and level cuts, set a bevel to the angle *a* for plumb cut and to the angle *b* for level cut. So much for the common rafter.

In roofs of equal pitch on both sides of the hip the run or seat of the hip rafter stands at an angle of 45 deg. to the seat of the common rafter; in other words, it is the diagonal line of a square.

Again referring to Fig. 1, we have the right angle triangle *c-d-C*, the sides of which forming the right angle at *C* are each 12 in., and the third side, *c-d* (17 in.), shows that 17 in. is the diagonal measurement of a foot square and, being so, is the equivalent in the run of the hip rafter for 1 ft. in the run of the common rafter. We have also in Fig. 1 the right angle triangle *A-e-f*, with a run 17 in. and a rise 8 in., which gives 18¾ in. as the length of the hip rafter for each foot of run of the common rafter. We may obtain the full length by the means explained above in the case of the common rafter. It should be said that the figures given in connection with Fig. 1 are not mathematically correct but are sufficiently so for all practical purposes.

In order to obtain the bevel for the cross-cut of jack rafters, proceed as follows: Fig. 3 shows the right angle triangle *a-b-D* of Fig. 1, which gives the level and plumb cuts of the common rafters. Draw the line *c-d* parallel to *a-b* to represent the thickness of the timber used. Square across from *a* to *c;* on the line *D-b* set off *D-e* equal to the thickness of the timber and draw the line *e-f* parallel to *a-D*. Connect *c* with *f;* then the line *c-f* is the cross-cut for the jack rafters. Set a bevel to the angle formed by *f-c-d*.

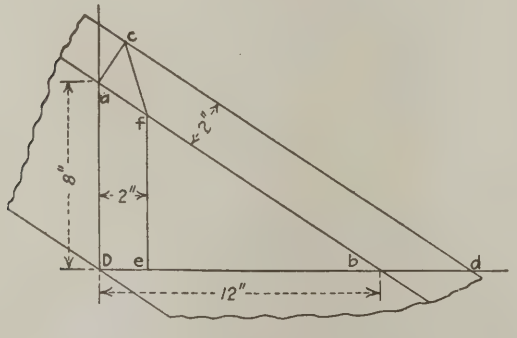


Fig. 3—Method of Finding Cross Cut for Jack Rafters

By a similar process we obtain the cross-cut on the hip or valley rafters where they fit against the ridge or against each other. Hip and valley rafters should always be measured on a line in the center of their thickness, the reason for which will be explained as we proceed.

In Fig. 4 we have the right angle triangle *e-f-A* of Fig. 1, only for convenience it is shown with the angle *e* pointing in the opposite direction; *e-A* (8 in.) gives the plumb cut and *A-f* (17 in.) gives the level cut of the hip or valley rafter. In this case we lay off *g-e* for the thickness of the timber and *m-l* the center line, parallel to *e-f*. Now square across *g-e* and lay off the distance *A-j* equal to half the thickness of the timber and draw *i-j* parallel to *e-A*. Through *m* draw *i-h;* then the line *i-h* is the cross-cut required. Set a bevel to the angle formed by *g-h-i*.

In roofs where the rafters are allowed to project beyond the wall plate to form projecting eaves it is a mistake to consider the top of the wall plate the height of the wall. It is this consideration that affords occasion for the use of the so-called "working line" and what a recent writer was pleased to call the "mathematical ridge." The outside edge of the wall plate is not the point where the wall finishes and the roof begins, but rather where the plumb line cuts the back of the rafter. The length of the rafter should be laid off from this point. What remains of the plumb line above the wall plate or seat of the rafter should be considered as being added to the height of the wall. In this way we lay off the length of the rafter in the right place—from the outside of the wall to the ridge. An illustration of this is shown in Fig. 5, which needs no comment.

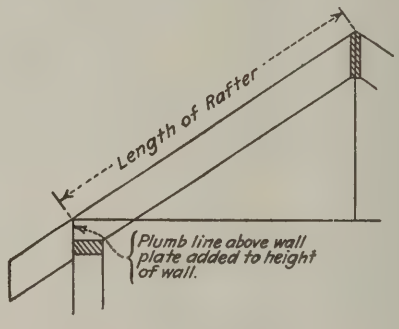


Fig. 5—Showing How to Lay Off the Length of the Rafter in the Right Place

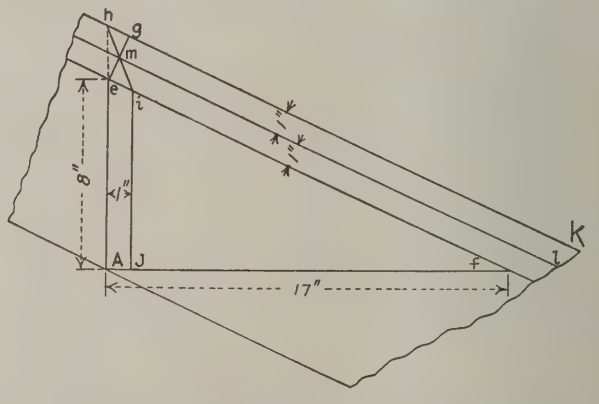


Fig. 4—Method of Obtaining the Cross Cut on Hip and Valley Rafters

The Steel Square and Roof Framing—By "J. C. M."

In Fig. 6 is shown the seat notch in the common rafter where it fits over the wall plate. It will be observed that there are 4 in. of the plumb line left standing above the seat line. This need not be followed in all cases; but whatever is here, it is absolutely necessary that it should be the same in all the rafters, as shown in Figs. 6, 7 and 8. In cutting the seat notch in the hip rafter after the length is laid off on the center line, as from *m* (Fig. 4) to *d* (Fig. 8), which shows the seat notch of a hip rafter, square across at *d* and make the plumb line *a-c*. Back on the rafter half the thickness of the timber from *a-c*, draw another plumb line *e-f*, and upon this last line lay off the distance left plumb over the seat line on the common rafter and draw the seat line at right angles to it. Cut by the first plumb line *a-c*.

Fig. 7, I think, tells its own story and needs little explanation.

It will be seen that *d* (Fig. 8) is the lower extremity of the rafter. Square across at *d* and draw the plumb line *e-f*. Upon this lay off the proper height and draw the seat line. Now add to the seat line half the thickness of the timber *f-g* and draw the cutting plumb line *a-c*. In the case of a hip rafter like that shown at *B* (Fig. 2), the rafter is measured on the center line and the extreme height squared across, as at *d* (Fig. 9), and the plumb line *e-f* drawn. On each side of this line lay off half the thickness of the timber and draw the plumb lines *a-b* and *g-h*. On the line *g-h* lay off the proper height and mark the seat line. A bevel set at the angle formed by *c-a-g* gives the mark for the cut to fit against the wall plate.

The valley rafter shown at *A* (Fig. 2) should be measured in the ordinary way and the seat notch



Fig. 6—Seat Cut of Common Rafter

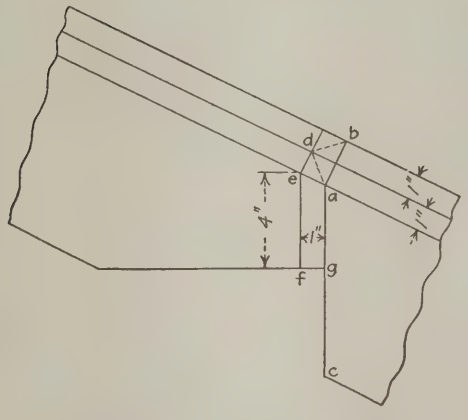


Fig. 7—Seat Cut of Valley Rafter

made as shown in Fig. 7. The upper end, where it fits against the rafter *B*, is a square plumb cut. The measurement gives the length to the center of the rafter *B;* therefore, half the thickness of it must be taken off the rafter *A*—not off its length, but measured at right angles to the plumb cut.

The length of all rafters is measured from the outside of the wall to the center of the ridge; therefore, where a ridge board is used half its thickness measured at right angles to the plumb cut must be taken off all rafters butting against it.

In explaining the use of the steel square, some would-be teachers use expressions which, if not misleading, are at least puzzling to the uninitiated. For example, "to obtain the cuts for cripples (jack rafters), take the length of the common rafter on the blade and the run of the common rafter on the tongue, etc., etc."

Now, this run of the common rafter, to my mind, seems irrelevant to the work in hand. We are treating the plane of the roof of which the backs of the jack rafters form a part. Why, then, go around the job looking for the figure on the tongue of the square when we have it right before our eyes? Now, it is not what a person says that counts so much as the manner in which he says it. If those who profess to know things and teach them to others would explain *why* this or that is thus, it would be better for those whom they wish to teach.

Let us, for example, take a young man on the job with us to cut the frame of a roof. We will say that he is a pretty studious young fellow and very anxious to learn, but as yet knows nothing about the job only what he has learned from his own ob-

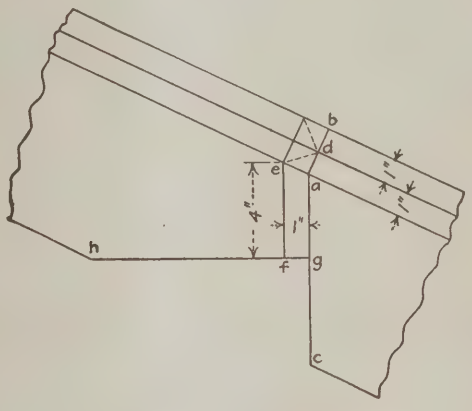


Fig. 8—Seat Cut of Hip Rafter

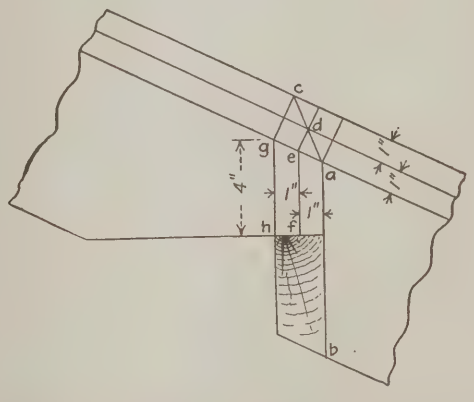


Fig. 9—Showing the Rafter Marked for Thickness of Timber and Plumb Lines

The Steel Square and Roof Framing—By "J. C. M."

servation. We place a steel square in his hands, and say:

"Here, start and cut those jack rafters."

We give him the figures on the square for the plumb and level cuts. Yes, he can understand that all right; the plumb and level cuts are square with each other. We give the figures for the cross-cut thus, "the length of the common rafter on the blade and the run of the common rafter on the tongue." He takes the square in his hands, looks at it, then his mind's eye falls upon the common rafter and the relation of its length to its run.

"Hang it! The run of the common rafter is not at right angles to its length, and how am I to reconcile that to my square? It may be right, but I don't understand it."

"No," we say; "it certainly needs explanation before you can be expected to understand it. But it is correct, all the same. Now, look here. You see this little diagram; it is just four lines of equal length forming a square, with one diagonal line drawn to opposite corners. Now, the diagonal line represents the run of the hip rafter. These two sides of the square meeting at this end of the diagonal line represent the run of two common rafters —one each side of the hip. The two sides of the square meeting at the other end of the diagonal line represent the portion of the wall plate within the run of the hip rafter, or the length of wall plate forming the base of the triangle to be filled in with jacks. You see, it is exactly the same length as the run of the common rafter; that is why we take the run of the common rafter with the length."

A light kindles in the young man's eyes, a smile plays around the corners of his mouth.

"Yes, yes; I can see it now, all right. If I lay the blade of the square along here by the edge of the wall plate the blade runs up the side of the rafter. Thanks, Boss, for that explanation; it's worth dollars to me, and so easy to remember."

Largest Office Building on Pacific Coast

What is said to be the largest office structure west of the city of Chicago is the new building about to be erected in San Francisco, Cal., for the Southern Pacific Railroad Company. It will be of steel skeleton frame construction with curtain walls of concrete and brick and the face will be brick and terra cotta. The nature of the ground, formerly tide land, requires careful foundation work, and 2123 piles each 115 ft. long will be driven to bedrock under the footings.

The structure will be 10 stories in height with deep basement, will be in the shape of an "E," the back extending the length of the block on the south side of Market Street from Stewart to Spear Streets, a distance of 275 ft., the depth on the two side streets being 209 ft., and the estimated cost fully $1,250,000.

The feature of the front will be a row of terra cotta columns and arches, extending to the top of the second story. The main entrance on Market Street will be full two stories in height, with a lobby finished in white marble. All corridors will be floored with marble, and the woodwork throughout will be oak.

Bliss & Faville are the architects, and the first actual construction will be done by the Van Sant-Houghton Company, which has the contract for piling, concrete caps, footings, etc.

The Most Costly Woods

It has been claimed that the small piece of spruce used in the manufacture of a high-class violin is the most costly wood in the world. The test is not fair. It is the work bestowed on the wood, and the name of some famous maker associated with it, that give the spruce in a violin its value. The test is the wood bought in the rough, before any value has been added by manufacturing. Measured in that way, spruce, even the finest that the market affords, does not measure in value up to a number of other woods. A value of $100 a thousand feet would be excessive.

It is not possible to say what is the cost of any wood. The cost varies with time, place, and quality. Very fine samples may sell for two or three times as much as ordinary samples of the same wood. The fairest method of coming to a price is to take averages in a good market during a considerable period of time, and the cost should be at wholesale, so far as the wood has a wholesale value.

Calculated in this way the list which follows gives some of the costliest woods in the American market, but not all of them. Doubtless some which are not in the list are as expensive as some that are there, but the list will answer the general purpose of showing the range of expensive woods in the market. The figures are taken, for the most part, from reports of wood-using industries of either New York or Illinois, and are the average prices paid during one year. They should, therefore, be fairly representative. All of the values are based on the basis of 1000 ft., board measure. Some expensive woods are bought and sold by the pound, but where price is given it is calculated on the basis of 1000 ft.

The following list of woods and prices is compiled from actual purchases:

Wood	Cost per 1000 Feet	Wood	Cost per 1000 Feet
Mahogany	$140	Cocuswood	$275
Cocobal	160	Vermillion	300
Madagascar tulip	180	African walnut	321
Donsella	203	English oak	340
Rosewood	220	Amaranth	400
Teak	262	Turkish boxwood	400
Circassian walnut	275	Sandalwood	400
Ebony	275	Satinwood	400
Australian plum wood	275	Snakewood	575

Every one of the foregoing woods is foreign. Black walnut is usually credited with being the most expensive wood of the United States. The claim probably holds good if only woods in general use are considered. Mesquite lumber, sawed for furniture, sells for more than black walnut, but it is not regularly in the market and is sawed to order and in small amounts only.

The Highest Priced Wood

In searching for the highest priced wood in the world, according to present markets, says *Hardwood Record,* the honor will doubtless fall on malacca (*Calamus scipionum*). This is neither a hardwood nor a softwood, but a climbing palm found in the jungles of Siak on the island of Sumatra. It is used for canes. The choice stick for a cane is cut from between the joints of the palm, and must be 40 in. long. That length is quite unusual, and long search is required to find one. It is said that from 50,000 to 100,000 pieces must be sorted to find one that is perfect. However, good prices are obtained for those which are not faultless, and it is not necessary to throw away imperfect stock. When a perfect specimen is found it is handled with the greatest care, for it is worth almost its weight in gold.

A malacca cane of fair quality sells for $50, while the best, with artistic taper and perfect crook, is worth $125. If the stock in such a cane is reduced to board measure, and the value figured on that basis, it is found that it is worth the enormous sum of $700,000 the thousand feet. No great part of this is due to cost of manufacturing, but can be charged to the expense of finding the high-grade stock in the jungle and taking it to market.

An Eighteenth Century Roof Truss

The Framing Is a Combination of Several Styles but the King-Post System Predominates

AN elaborately and scientifically designed roof will always attract a considerable amount of attention, and to those who possess technical knowledge, and who are conversant with the theory of framed and braced structures, is an object of interest, and intensely absorbing from various points of view. The workmanship will be carefully examined if circumstances permit, and the design studied with interest, the observer tracing the means by which the weight is distributed through the various portions of the structure, until it is ultimately deposited vertically on the supports.

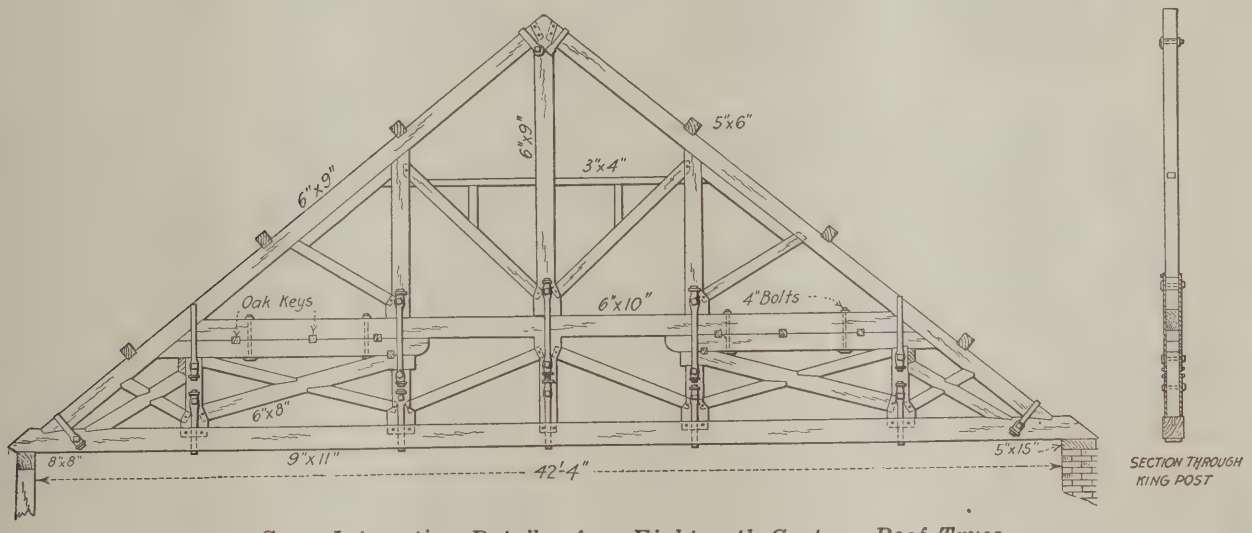
At Stratfield Saye House, celebrated as the Hampshire residence of the Dukes of Wellington, is a large building, the roof framing of which is shown in the accompanying illustration. The method of framing adopted appears to be a combination of several styles, in which perhaps the king-post system predominates, says a writer in *The Illustrated Carpenter and Builder* of London. The illustration, which is drawn to scale from measurements taken from the roof itself, will show the general construction, the size of all timbers being marked on each member.

The building itself, which is 110 ft. long by 42 ft. wide, was originally erected for a riding school more than 100 years back, but has since been adapted for use as a covered tennis court, with a stone flagged floor. It is similar in design and construction to the one at Hampton Court, and was probably remodeled and laid out as a replica of that building at some later date. The height from floor to under side of tie beam is 21 ft. 3 in.

There are nine roof trusses, spaced 10 ft. 3 in. apart, the principal rafter having a pitch of 40 deg. with the horizontal. The timbers are mostly sawn, but in some cases the adze marks may be seen, notably on the tie beams. The whole of the roof, with the exception of the wall plates and keys, is of fir, and is in a very fair condition structurally, although some parts are considerably worm eaten and crumbling on the surface.

The workmanship, as is usually found in most timber constructions of this date, is rough, no pretensions being made to a particularly fine finish.

The joints at the lower end of all vertical members are secured with a mortise and tenon, but in no case, except at the intersection of the principal rafters with the king post, and at the posts at the extreme ends of the tie beam, is the top of these members provided with any fixing beyond a plain butt joint, held in position by an iron strap.



Some Interesting Details of an Eighteenth Century Roof Truss

The position of the purlins varies in the actual roof, and they are only indicated approximately on the drawing as regards both position and construction, owing to the difficulty experienced in obtaining a satisfactory inspection of anything outside the principal rafter. The roof is boarded with ⅞-in. fir boards, and as these are flush with the back of the principal rafter and are carried across on a level with, and supported by, the small member marked 3 in. by 4 in. to form a ceiling, access to all parts beyond this boarding is very limited. The collar beam is strengthened at each end as shown by an 8-in. by 6-in. beam, which is placed underneath, the two being connected by means of 1-in. iron bolts and oak keys, and supported by two short posts.

All the iron stirrups and straps are out of 2¼-in. by ½-in. wrought iron. They are expanded at the bolt hole in order to strengthen the bar at this point. The ends of each strap are caulked, and, as an additional fixing, a square staple is driven into the timber astride the strap and close up to the caulking. The bolts are all 1-in. in diameter, with

2¼-in. square nuts. No provision is made for tightening up the joints of the framing by means of wedges or joint bolts. The tie beam being 3 in. thicker than the other members, as shown on the section, is mortised through its depth on each side, and the stirrup passed up through the mortise and connected with the posts as described, thus weakening the beam as little as possible. The ironwork is very primitive, both in its construction and application, the heads of the bolts in particular being hand forged to a rough mushroom shape.

At the right of the elevation it will be seen that the roof is carried on a 5-in. by 15-in. oak plate, which in its turn is supported by an 18-in. brick wall.

On the opposite side the wall terminates about 4 ft. below the tie beam, and the 8-in. by 8-in. wall plate is carried on a series of posts of the same dimensions standing on the wall, one post being placed under each truss. The tie beam and wall plate are connected by iron angle plates and bolts.

The space between the top of the wall and the plate is left open the whole length of the building for the admission of light and air. On the right-hand side a large skylight is inserted in the roof between each pair of trusses, and is flashed with lead in the usual manner. The roof is covered with duchess slates, with sheet lead hips and ridge.

The design of the roof cannot be considered as economical, nor yet to be of a handsome appearance. Viewed from the ground it appears massive, especially as the more open part at the top is partially hidden by the ceiling, allowing only the lower and more complicated portions to be in evidence.

Details of Bay Window Construction

Manner of Making Frames in the Planing Mill and the Trimming of Them on the Building

By John Wavrek, Jr.

FROM time to time there have appeared in various publications devoted to the woodworking interests, valuable contributions concerning the making of window and door frames. These have shown that what one man has regarded as a very good construction some other capable worker has pointed out wherein the method was lacking, at least according to his own experience, and has endeavored to show a form of construction which he considered more efficient as well as more economical. These little controversies are as they should be because they are the means of bringing out the best possible results in frame-making, laying bare, ofttimes, some weak part of their construction and showing how they may be greatly improved. There is, however, one phase of the window frame work which has been very little considered, and that is, the construction of bay window frames in the planing mill and the trimming of them on the building itself.

In the sketches presented herewith I have endeavored to show as clearly as possible the different methods of construction of bay windows as they are made in the section of Pennsylvania in which I reside. There has been made no effort to show the best possible way of placing the rough frame work because that is really the province of the carpenters who work on the building. It is my aim to show the make-up of the different frames best suited for the openings as provided by the carpenter together with the trim to complete the job and make a neat piece of work.

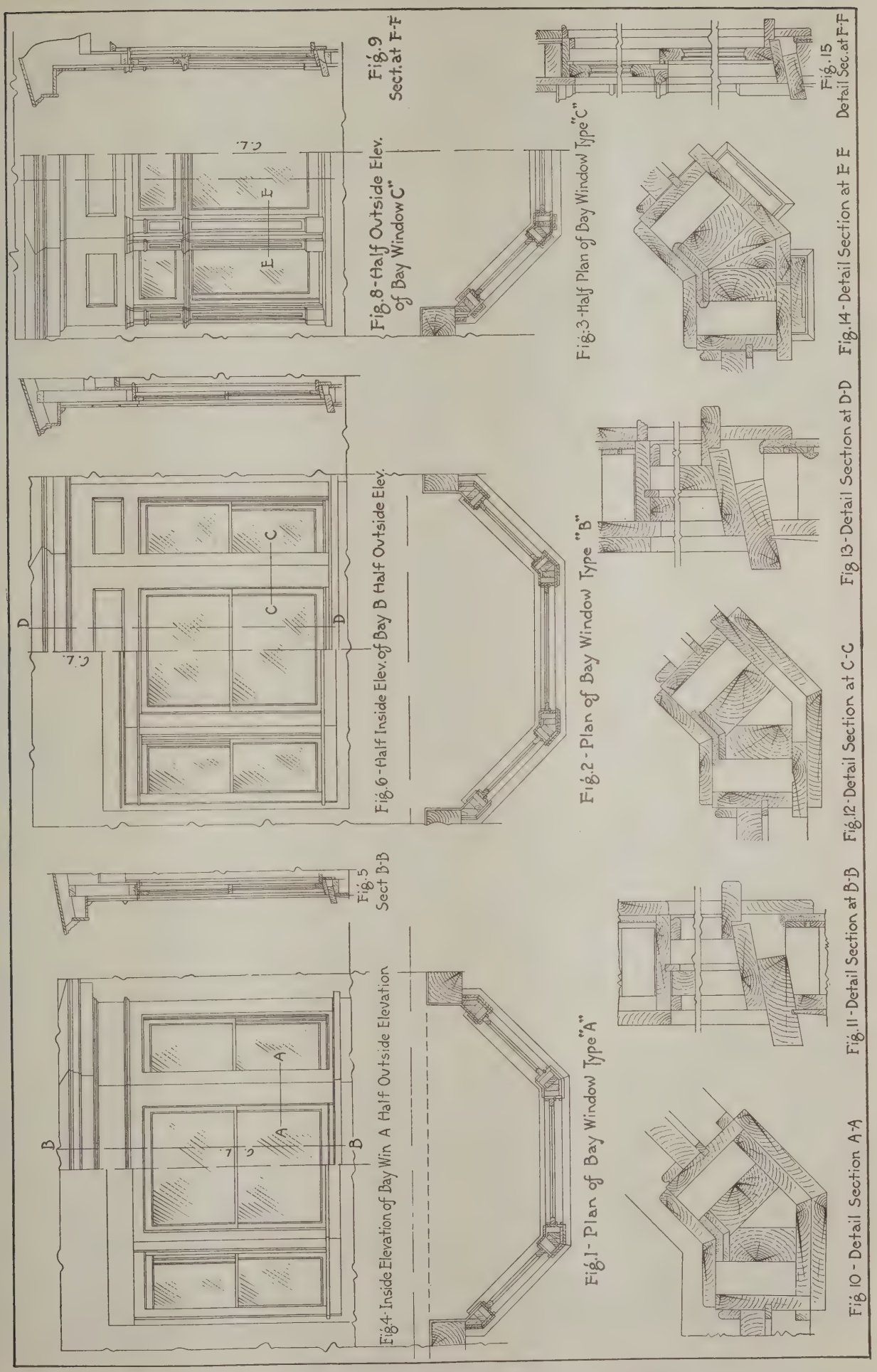
Referring to the sketches, Fig. 1 shows the floor plan of a style of bay window which is very extensively used; in fact, there are few houses of the regular run which do not include a bay of this kind in the design. Fig. 4 represents a half inside and half outside elevation of the window when completed by the carpenter. In this instance 2 x 4-in. studs have been used sheathed on the outside with ⅞-in. boards. The frame would be made in skeleton at the mill without any outside casing, the latter being measured up after the frames are placed in position. Figs. 10 and 11 show in detail how the frames are built and the method of trimming them.

Fig. 2 is a plan of the same kind of a window as shown in Fig. 1, except the treatment of the frames is different. Where, as in Fig. 1, sheathing is placed on the studs there is none used in the window indicated in Fig. 2. Here the frames are provided with ⅞ x 3¾-in. outside casing at the studs and ⅞ x 5¾-in. heads. Afterward when the frames are in position on the job the millman measures up for the other necessary trim to complete the bay window. Fig. 6 shows a half inside and a half outside elevation; Fig. 7 a full length section through the window on the line *D-D*, while Figs. 12 and 13 represent the sections in larger detail.

In Figs. 3 and 8 are shown plan and elevation of the same style window but on a rather more elaborate scale. The frames involve a somewhat different construction, and the general treatment is clearly indicated in Figs. 9, 14 and 15.

The frames for this bay window also have a ⅞ x 3¾-in. outside casing and the same size of head. The corners are treated with beveled casings, as shown in Fig. 14, which is a detail of Fig. 8 on the line *E-E*. The pilasters have been added and in addition to being ornamental they also serve to close up the joints of the casings. Fig. 8 shows the outside appearance of the bay, the inside treatment being the same as that indicated in Fig. 6.

It is hoped that with the aid of the sketches the different schemes will be rendered perfectly clear to the reader. No doubt other methods of making bay window frames prevail in different localities, but the writer is of the opinion that the ones here represented are very extensively used.



Details of Bay Window Construction—Various Types

A Frame Cottage for the Suburbs

A Well Arranged House with Six Rooms and Bath—Shingled Walls and Roof



THE subject of our colored supplemental plate this month is an attractive story and a half cottage with field stone foundations and shingled walls and roof. Noticeable features of the exterior are the dormer window section which breaks the broad sloping roof, the unique entrance effect and the pergola which extends in front of the living room.

An examination of the floor plans shows the interior space to be divided into six rooms and bath. The feature of the main floor is the living room, which extends the full depth of the cottage and has at the end an open fireplace with face and hearth to be laid with chrome orange unglazed tile in 8 x 6 in. squares. This open fireplace is served by an outside chimney built of field stone and having bluestone cap 5 in. thick. The flues are 8 x 12 in. and lined with tile.

Main Hall and Stairs

The main hall and stairs occupy a section through the central portion of the house, the flight to the cellar being directly under that leading to the second story.

At the left of the hall is the dining room, beyond which is a commodious pantry which communicates with the kitchen, the latter occupying a wing or extension at the extreme left of the building. The pantry is well equipped with cupboards, drawers, bins, etc., and the sink is placed directly under a double window in the rear wall. The arrangement is also such as to give direct communication between the pantry and front hall, and avoids the necessity of passing through any of the principal rooms in going from the kitchen to the front entrance door.

On the second floor are three sleeping rooms, one of which extends the full depth of the house, directly over the living room. Features of this room are the seat at the rear wall under the window, and the three large clothes closets. The bathroom is at the front of the house and the hall space is reduced to a minimum. An idea of the internal arrangement at this point may be gathered from an inspection of the detail on another page which represents a vertical cross section of the building taken on a line running through the stairs and bathroom.

Foundations

The foundation walls are to be 16 in. thick with joints well pointed on all exposed masonry. The footing courses are to project 6 in. on each side of the field stone foundation walls and are to be 10 in. thick.

The main walls of the cottage are to be of wood construction, the outside studs to be covered with 1-in. tongued and grooved North Carolina pine boards laid diagonally. Over this is to be placed a layer of heavy building paper and this in turn covered with shingles, although stucco on metal lath can be substituted if preferred. The rafters are to be covered with sheathing boards upon which are to be placed cedar or asbestos shingles, according to preference, laid in regular courses with 5½ in. exposure to the weather. The shingles are to be fastened with galvanized iron nails.

Kinds of Wood to Be Used

All floor beams, plates, girders, etc., are to be spruce or hemlock, according to the preference of the owner, and all exposed woodwork is to be of first quality white pine or cypress.

The finish of the interior trim on the first floor with the exception of the kitchen and the pantry is to be chestnut. The trim of the kitchen and pantry is to be North Carolina pine. The trim of the entire attic floor is to be of basswood and the doors are to be of birch.

The entrance door is to be 2 in. thick, veneered with quartered oak on white pine core, and be glazed with polished plate glass, six lights and one panel, as shown in the detail. The pantry doors are to be double acting.

The leaders, gutters, roof flashing, etc., are to be of best quality tin painted on both sides before installing. Step flashings are to be set into the chimneys at the rake of the roof to insure against leaking.

The Plastering

The plastering is to be three-coat-work and the living room, hall and dining room are to have a sand finish. All other rooms on the first and second floors are to have a hard white finish.

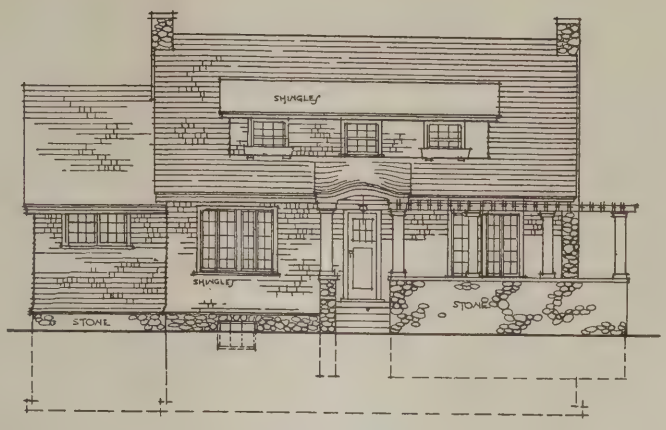
The bathroom is to have porcelain enameled iron fixtures and the bathroom floor is to be finished in white tile on a bed of cement cinders. It is to have sanitary cove, wainscot and cap. It is also to be fitted with a medicine closet.

The kitchen and pantry sinks are also to be of porcelain enameled iron of standard make properly fitted and set. The soil pipe is to be 4 in. in diameter and the vents 3 in., all of cast iron. The house is to be piped for gas and wired for electricity, with combination fixture outlets in all rooms and hallway, also outlet in cellar and at the front entrance.

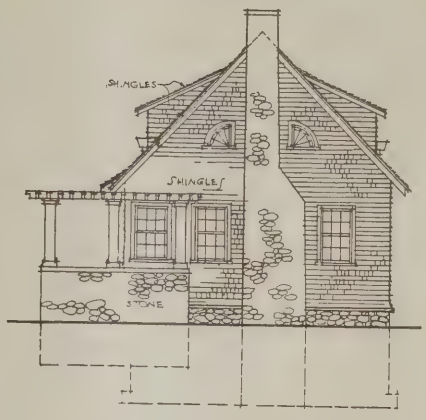
The heating is to be by means of hot air, the furnace to be of such capacity as to furnish a temperature of 70 deg. within when it is zero outside. The top of the heater is to be at least 24 in. below the finished ceiling. Side wall registers are to be used in every room except the kitchen and pantry,



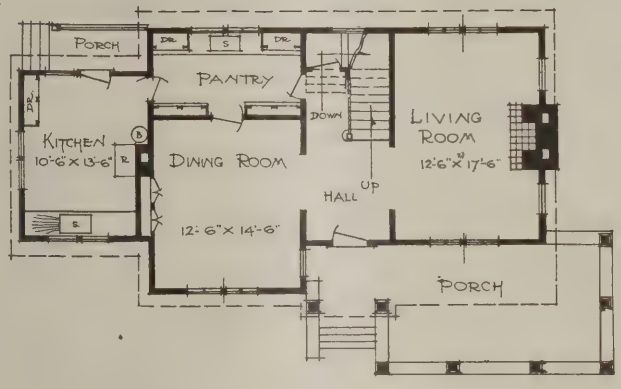
BUILDING AGE



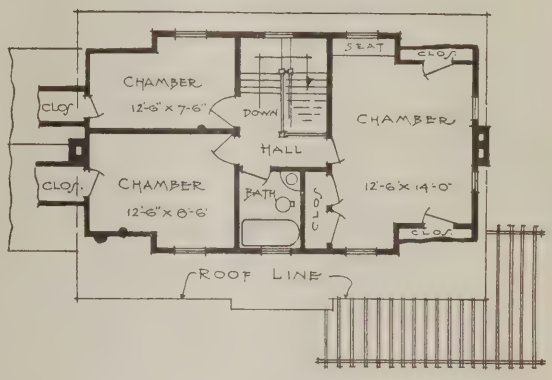
FRONT ELEVATION



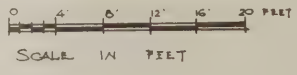
SIDE ELEVATION

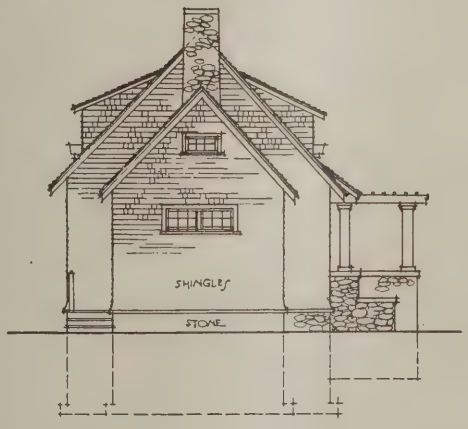


FIRST FLOOR PLAN

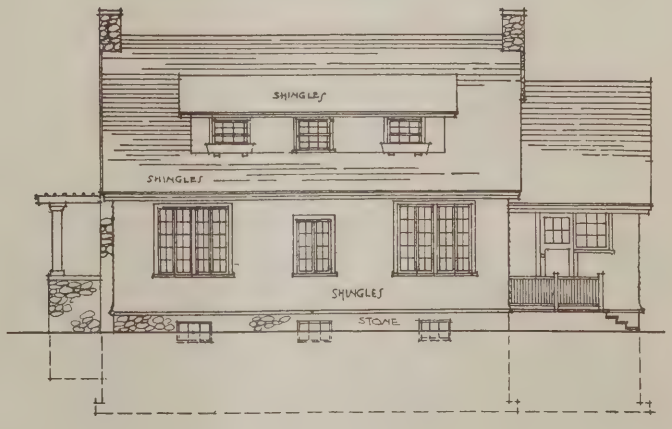


SECOND FLOOR PLAN



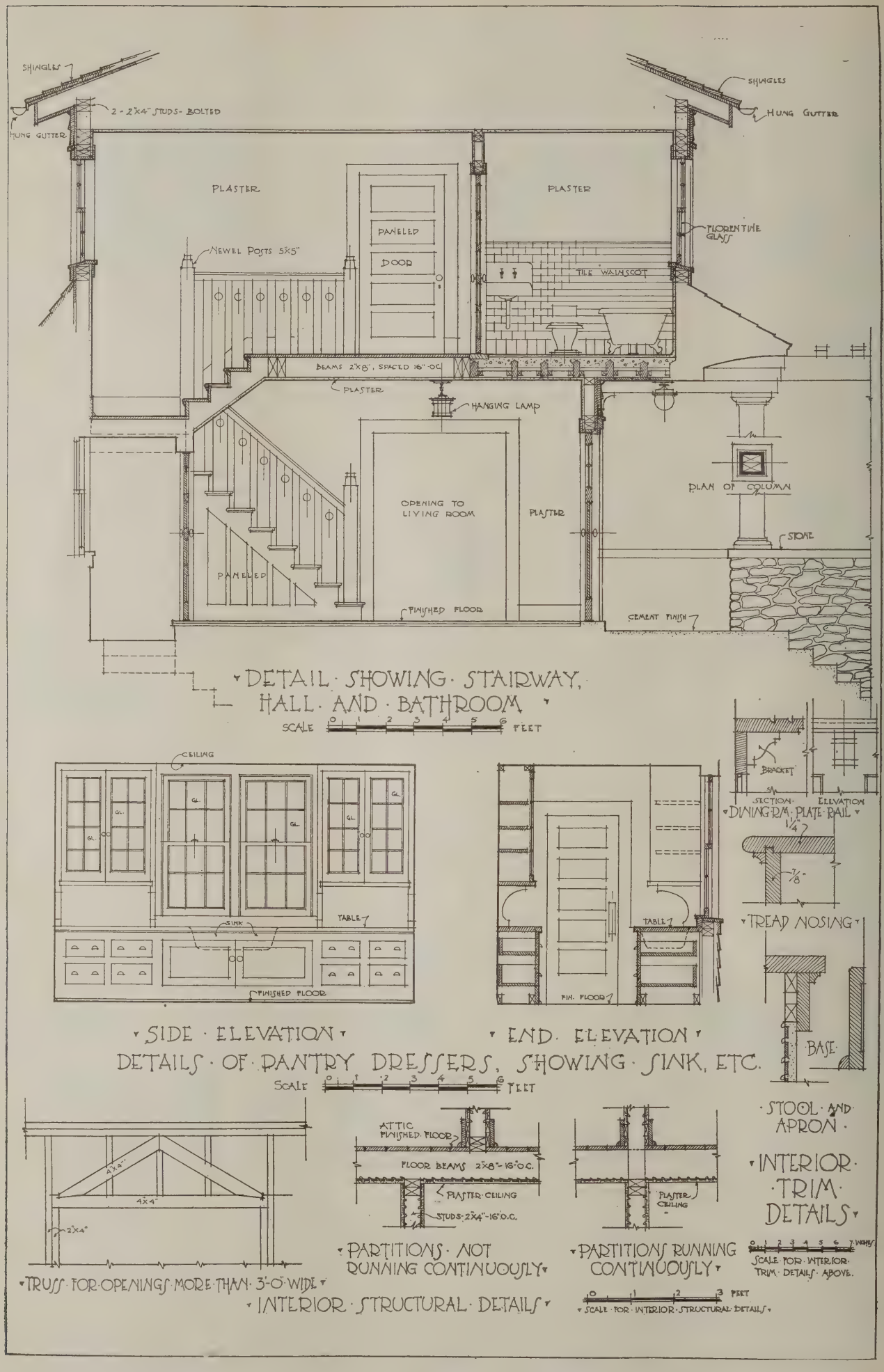


SIDE ELEVATION



REAR ELEVATION

Plans and Elevations of the Frame Cottage for the Suburbs Shown on the Supplemental Plate



Miscellaneous Constructive Details of Frame Cottage for the Suburbs Shown on Supplemental Plate

and they are to have a neat lattice grill with regulator.

All hardware in the bathroom is to be nickel-plated and throughout the remainder of the house the ornamental hardware is to be a dull brown finish.

All exterior woodwork, except the shingles, is to have three coats of white paint, ground in pure linseed oil. The roof shingles are to be stained a dark blue-green before laying. If asbestos shingles are to be used, they are to be of the same shade. The shingles on the exterior walls are to be white in finish.

All interior trim is to have two coats of varnish and to be stained dark brown with a wax finish.

According to the estimate of the architect, the cottage here shown has a cubic content of 24,293 cu. ft., upon which he places a unit price of 20c. per cubic foot. This estimate, he states, does not include a contractor's profit, nor does it cover any particular section of the country.

The design here illustrated and described was prepared by Architect Frank T. Fellner, 413 Caton Avenue, Brooklyn, New York, or care THE BUILDING AGE, 239 West Thirty-ninth Street, New York City.

Woodwork in Wall Board Interiors

Various Woods Available for Trim—Paneling Effects—Moldings—Numerous Examples Illustrated

BY JOSEPH A. POESL

AS an interior finishing material, wood is hardly equaled. There is something about it which imparts an atmosphere of life and health. It is beautiful and friendly. With it comes a human sentiment unequaled by any other material which we construct homes with for shelter, comfort and beauty. In fact, it creates an ideal expression of the home, and lends to that an expression of warmth, sweetness and hospitality.

A room finished with wall board offers more opportunities for the enjoyment of these desirable qualities of wood than does a plastered room. Such a room calls for not alone the use of the usual wood trim found in practically every room, but for paneling strips, picture molding, plate rail, wainscot cap, chair rail, and other decorative woodwork. Thus the increased use of wood for interiors is encouraged, which is one of the reasons for the tremendous popularity of wall board.

Yet it must not be assumed that a wall board interior is, consequently, more expensive. The truth is, generally speaking, it figures about the same as one with lath-and-plaster walls in this respect. The fact that the former is always paneled with

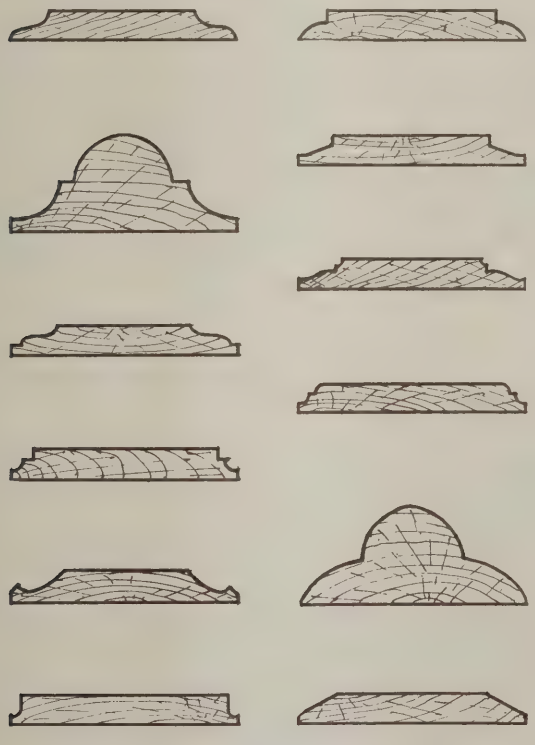


Fig. 1—Various Styles of Paneling Strips

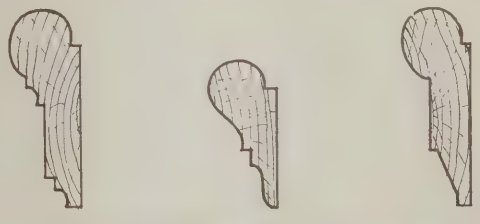


Fig. 2—Three Types of Picture Moldings

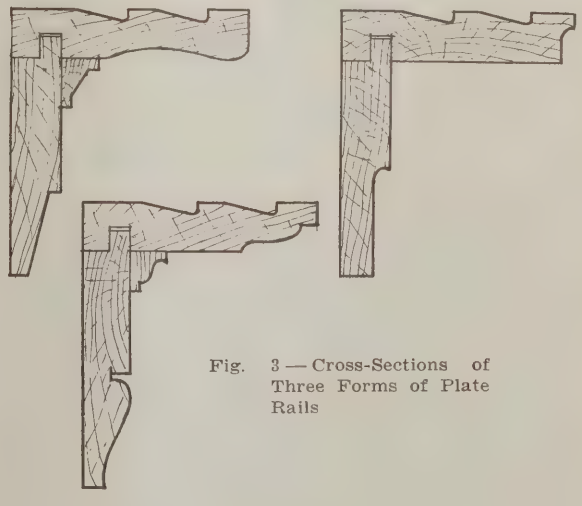


Fig. 3 — Cross-Sections of Three Forms of Plate Rails

Woodwork in Wall Board Interiors

wood strips is really an advantage, for, unquestionably, paneling is a most excellent means of decorating walls and of securing charming interiors at a low cost.

We are beginning to realize the superb effects obtainable by different treatments of wood and learning to apply the characteristic virtues of each variety to their best usage. The new and simple methods of treating wood now in vogue do not conceal but rather emphasize its beauties. Indeed, wall board is fortunate in that wood is its indispensable complement.

To-day, the tendency is much toward the use of soft woods for interior trim. As a result, cypress, California redwood, Douglas fir, yellow pine and white pine are in great demand. If, however, it is desired to use a hard wood, let us not overlook our native products. There is no need to pay high prices for imported woods when, for example, birch can be substituted for mahogany. Properly stained, it is such a perfect imitation that only experts can distinguish it from the other. It may be surprising to the layman to learn that natural mahogany is light in color, much like other woods, and only by copious staining does it reach its conventional color. Another American wood which closely resembles an expensive imported wood is red gum. It is hard to tell it apart from Circassian walnut. On account of its low price it is puzzling why it is not more popular with home builders.

Paneling strips, as shown in Fig. 1, are all-important in a wall board room. In themselves, they are capable of creating any style of interior decoration, or of accentuating the style that may be already existing. It follows, then, that it is well to exercise care to properly design and adapt them. As almost everybody is aware, they are placed over the joints formed by wall board panels. In order to show the limitless possibilities for variety in paneling strips, a dozen different designs are illustrated. These have been selected haphazardly. They should not, therefore, be utilized without regard for other trim, and the greatest pains should be taken to have them match it. Paneling strips are never less than $\frac{3}{8}$ by $1\frac{7}{8}$ in. in size, and may be as large as $\frac{5}{8}$ or $\frac{7}{8}$ by 6 in.

Picture molding, like other decorative moldings, is not actually essential in a room covered with wall board, but it can be used to very good advantage instead of a paneling strip to conceal a horizontal joint, and at the same time to improve the appearance of the room. An important feature to remember in connection with picture molding is to have it always generous in size. Those stingy-looking picture moldings commonly seen have no decorative value whatever. Several typical picture moldings of good design appear in Fig. 2 of the illustration.

In dining rooms and dens, plate rail—Fig. 3—is particularly appropriate. It is customarily located about six feet from the floor. As is the case with all moldings in wall board construction, plate rail is a component part of the wall itself when placed over a panel joint—not a mere fastening. It is poor policy to buy such illy-designed plate rails as are sold by the average wall-paper dealer. They are generally a conglomeration of curves, and are ridiculously unfit for any room.

Then there are chair rails and wainscot caps, as shown in Fig. 4. The difference between the two is that chair rail is located on the wall at such a height as to protect it from the backs of chairs, while wainscot cap is located higher, at the division line between the wainscot, or dado, and frieze. Some chair rails might do for wainscot caps, but very seldom are wainscot caps used in place of

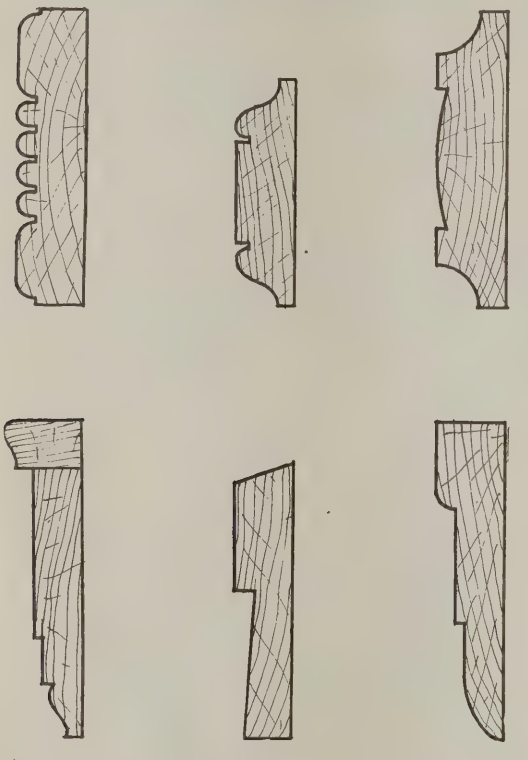


Fig. 4—Designs of Three Chair Rails Above and Three Wainscot Caps Below



Fig. 5—Cross-Sections of Crown Moldings

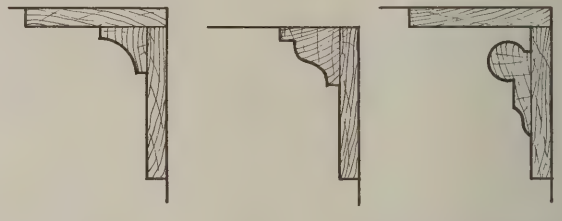


Fig. 6—Treatments of Ceiling Corners Without Crown Moldings

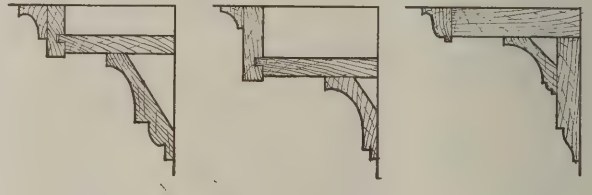


Fig. 7—Showing Cross-Sectional Views of Cornices

Woodwork in Wall Board Interiors

chair rails. Perhaps the moldings of these kinds shown will help to point out the distinction.

One of the most useful moldings in connection with wall board work is crown molding. Placed in the corner, at the conjunction of the wall and ceiling, it produces not only an attractive trim, but also does away with the two paneling strips which are ordinarily used in this corner. Thereby much labor is saved in addition to the enhanced appearance that results. There are many different crown moldings; only a few are shown in Fig. 5.

It will be observed that several other ways of treating ceiling corners are shown in Fig. 6. These are only interesting for their variety and to illustrate some methods of treatment without crown molding.

When an elaborate treatment for a ceiling corner is desired, a cornice is the solution. As will be seen in the illustration, Fig. 7, it is built up of several individual moldings. Cornices are used much for period decoration.

False beams, Fig. 8, are very often seen on wall board ceilings. They are not so very expensive,

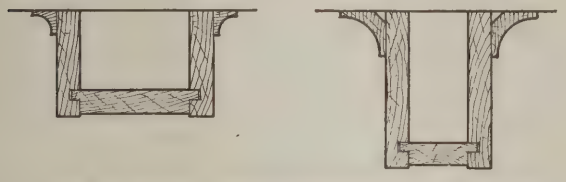


Fig. 8—Showing Cross-Sections of False Beams

In conclusion, moldings, particularly paneling strips, are frequently employed for decorative effect, and are, therefore, not always placed over panel joints. In such event it is necessary to put headers between the studs and joists directly behind them so as to provide a solid nailing background to which they can be fastened, holding the molding and wall board together in close contact.

A Difficult House Moving Operation

The moving of buildings involving difficult features in their execution is always a subject of interest on the part of our readers, as is evidenced from the attention given to the articles which we have published in the past illustrating and decribing jobs of this nature. One of the latest to which attention may be invited is that of moving what is known as the old Crocker residence near San Francisco, involving steep grades and sharp curves. The house is 85 x 135 ft. in plan, has six large chimneys, is four stories in height and of heavy construction, the weight being roughly estimated at about 800 tons.

In raising the building from its old foundations, five rows of 10 x 12-in. beams were placed lengthwise directly under the floor joists of the building. Under these longitudinal beams were placed 12 x 14-in. crossbeams spaced 3 ft. apart. One of the chimneys is estimated to have weighed 45 tons, and

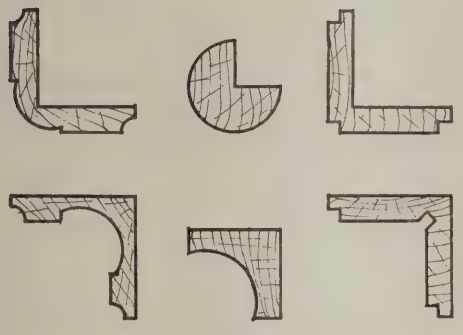


Fig. 9—Six Styles of Corner Moldings

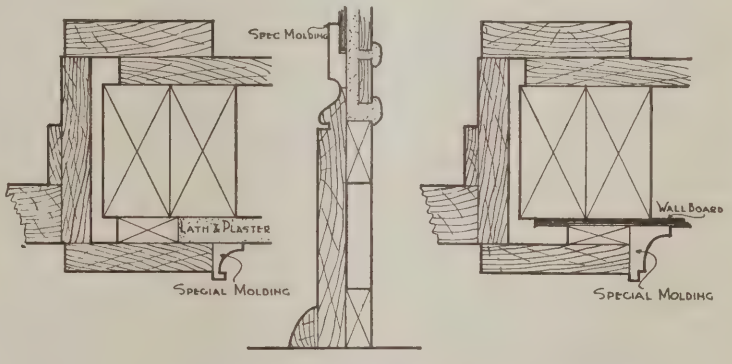


Fig. 10—Showing Applications of Special Moldings

Woodwork in Wall Board Interiors

and give to a room a certain dignity which is difficult to secure otherwise. The flat beam shown is the most common, while the other is used considerably for high ceilings with narrow panels.

Corner molding is also handy in wall board construction. It will be noticed that a set of moldings of each style are shown in Fig. 9, each set comprising a molding for an exterior and for an interior corner. These are labor-saving in that they are quickly applied, much quicker than two paneling strips could be put on.

We have yet to mention those special moldings used at the baseboard and around the door and window casings when wall board is applied over plaster, or when it is used with door and window frames made for lath-and-plaster walls. Invariably, they are especially designed and made, although stock moldings might be suitable in some cases. In Fig 10 are shown their shape, as well as how they are used.

under this extra beams were placed in order to carry the unusual weight.

Beneath and parallel to the crossbeams and resting in turn on two lines of 18 x 18-in. timbers running the full length of the building were short 14 x 16-in. spring beams. In this way, the load was finally centered on the two 18-in. beams which bore directly on the 8-in. rollers and to which was applied the "pull' for moving the structure along the runway. The drawing power was supplied by two two-horse teams on capstans operating 7-sheave tackles rove with $\frac{5}{8}$-in. wire rope. The tackles were attached to a 2-in. cable fastened to the 18-in. beams in such a way as to equalize the strain and prevent a greater pull coming on one tackle than on the other. The dead end of the hauling rig was secured by digging a 10-ft. trench 30 ft. long. This trench was bulkheaded with 8 x 10-in. timbers and in it were placed four upright posts 14 x 14 in. in cross section and 10 ft. long. A 2-in. cable was

wrapped around these posts and then led to a convenient point for attaching the tackle.

In carrying out the operation, a trestle 300 ft. long had to be built across a ravine and with a 500-ft. grade down which the house must descend at the rate of 1½ in. per ft. The contractor agreed to move the house without injuring the trees on the estate and in order to do this the house had to make some sharp curves in its journey. In one case a right-angle turn had to be made in about 400 ft. to avoid cutting the trees. A runway of house-movers' cribs was built ahead of the structure as it advanced. The rollers ran on a bed of 12 x 14-in. stringers resting directly on the cribs, and where the runway was highest the cribs were held in place with 12 x 12-in. braces every 20 ft.

Just before descending the steep grade it was necessary to swing the house through a half turn. This was done by building eight circular runways beneath the shoring and providing each with rollers. When this turntable, so to speak, was ready, the "pull" was applied at opposite corners in opposite directions, and by changing the direction of "pull" from time to time, the half revolution was successfully completed.

The house-moving contractor who superintended the work was Ellis Anderson of Burlingame, Cal.

Tenement House Construction in New York City

The cost of material and conditions in the labor market are reflected in the report of the Tenement House Department just issued which shows that though there was a decrease of nearly 33 per cent in the number of houses planned during the second quarter of 1916 in Greater New York, the cost of constructing them is $4,413,600 greater than for the larger number last year.

During the quarter in question 30 plans were filed for new tenement houses estimated to cost $24,805,500, as compared with $20,481,900 for the corresponding period of last year.

A remarkable increase appears in the valuation of tenements planned in Manhattan during this quarter as compared with the same quarter last year. During the quarter ending June 30 there were tenements planned to cost $18,761,000, while for the same period last year those planned were valued at $5,512,000. While it may be said that many of the plans were filed to forestall the operations of the zoning and heights resolution it is probable most of them will be built, although delay in starting many of these operations may be due to the cost of materials and scarcity of labor.

The value of tenements planned during the second quarter for the Borough of the Bronx is $3,633,000, while for the same period last year the cost was $7,089,500.

In Brooklyn during the period covered by this report tenements to the value of $3,537,500 were planned, while the corresponding figure for last year was $6,272,400.

The figures for the Borough of Queens for the same periods of the two years are respectively $874,000 and $1,620,500.

The number of tenements planned during the quarter for the whole city is 433. Eighty-eight of these were proposed for the Borough of Manhattan, 70 for the Borough of the Bronx, 167 for the Borough of Brooklyn and 88 for the Borough of Queens.

Last year during the same quarter 645 tenements were planned, 63 of which were for Manhattan, 158 for the Bronx, 268 for Brooklyn, 148 for Queens and 8 for the Borough of Richmond.

There are now in the city 104,244 tenement houses; of these, 77,743 are old law tenement houses and 26,502 have been erected under the modern law. There are now 6304 more tenement houses in the Borough of Brooklyn than in Manhattan. In the Borough of Brooklyn there are 47,202 tenement houses, while in the Borough of Manhattan there are 40,898. The number of apartments in Manhattan, however, is much greater than that in Brooklyn, there being 536,647 apartments in the former and 268,677 in the latter. The number of apartments in the whole city is 964,986.

Sheet Metal Contractors' Committees

President George Harms of the National Association of Sheet Metal Contractors recently appointed committees to have charge of various phases of the work of the association during the ensuing year, the chairman of each being as follows:

Warm-air Furnace—J. H. Hussie, 2407 Cuming Street, Omaha, Neb.

Apprenticeship—O. E. Cluss, 2408 South Jefferson Avenue, St. Louis, Mo.

Legislation—F. W. Stechow, 904 Central Avenue, Cincinnati, Ohio.

Trade Relations and Policy—E. L. Seabrook, 261 South Fourth Street, Philadelphia, Pa.

Fire Prevention—Fred de Connigh, 930 West Nineteenth Place, Chicago, Ill.

Overhead Expense—Louis Luckhardt, 508 Second Avenue, Pittsburgh, Pa.

Advisory—J. D. Riley, 2625 Sarah Street, Pittsburgh, Pa.

Trade Development—E. B. Langenberg, 4045 Forest Park Boulevard, St. Louis, Mo.

Lecture—F. B. Hiller, 3105 Detroit Avenue, Cleveland, Ohio.

San Francisco Labor Situation

Our San Francisco correspondent, writing under date of Aug. 5, says: "With the settlement of the waterfront strike late in July, and the resumption of work in the lumber yards on an 'open shop' basis, lumber began pouring in from the northern ports, and the local retail yards have had quite a rush. Construction had been postponed or retarded on many buildings throughout the city, and with plenty of material the work is now being hastened.

"Work on Class 'A' buildings is being retarded somewhat by a strike of structural steel workers. The Building Trades Employers' Association recently notified the Building Trades Council that the places vacated by the strikers would be filled at once under 'open shop' conditions, this action being endorsed by the Law and Order Committee of the Chamber of Commerce."



Some Aspects of Modern Shingling*

Various Methods of Treating the Hips— What Is Known as the "Boston Hip"

EDWARD H. CRUSSELL

FOR covering the hips on shingle roofs many different methods have been devised, some appearing to be native to certain localities. Perhaps the most primitive method is that in which the hip is covered with two boards in the same manner as usually adopted for the ridge. The courses are carried out to the hip and cut off without any particular care; then, after the shingling is finished, the hip boards are jointed and fastened in place over them, a lapped joint being used in preference to a mitered one as shown in Fig. 28.

Sometimes the hip is covered with a molding instead of boards. The molding is generally of circular section, recessed or rabbeted to fit the hip, as shown in Fig. 29.

Some builders prefer to cover the joint at the hip with metal shingles. This makes a weatherproof job, but is not acceptable to all tastes. Ornamented hip shingles can be purchased for this purpose, or a simple strip of tin or galvanized iron may be used. Perhaps the most simple form of home-made metal hip shingle consists of a strip of tin about 4 in. wide, long enough to extend two or more inches under the following course and with its lower end cut to a semicircle. This style of hip shingle is shown in place in Fig. 30.

Instead of cutting the lower corners of these

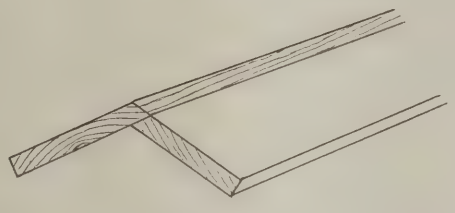


Fig. 28—View of the Hip Boards

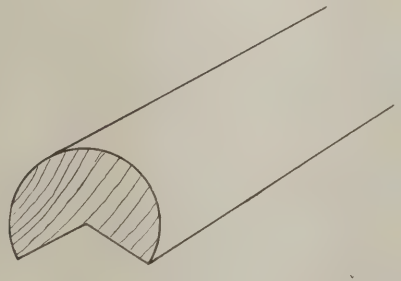


Fig. 29—Perspective of a Hip Roll

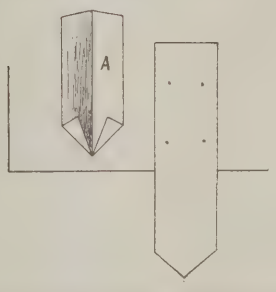


Fig. 31—Form for Bending Metal Hip Shingles

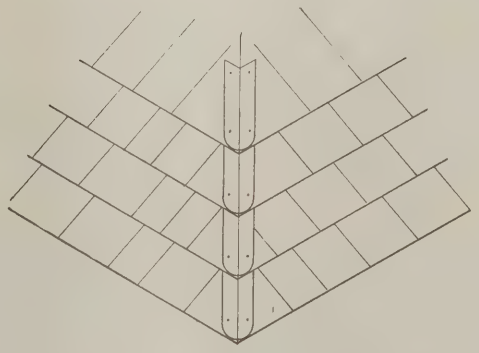


Fig. 30—Showing Metal Hip Shingles in Place

Some Aspects of Modern Shingling

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metal shingles, they are sometimes turned under in such a manner that they fit around the lower ends of the shingles on which they are placed and are held down by them. The easiest way to bend the shingle is over a form like Fig. 31. This is nothing more than a piece of shingle of the correct width and shape, fastened to the edge of the work bench or some other convenient place. The reverse side of the tin shingle is shown at *A* in Fig. 31. It is easily made and the turned corners, when slipped into place, obviate the necessity of nailing the lower end of it.

Another early method of covering hips was what has been called "weaving" them. This method requires that both sides of the hip be carried up at the same time. It is illustrated in Fig. 32. The course of shingles on one side of the roof is finished out and fitted to the hip by paring the edge. The last shingle of the corresponding course on the other side is then carefully pared and fitted over it. In the next course following, this procedure is reversed, so that the center joints of the shingles show a broken line up the hip.

The lower corners of these shingles require nailing and the nailing must be done carefully, as they are easily broken. Indeed, the ends of these shingles often curl up and split off from the effects of sun and weather after the roof is finished, which has led to a change in methods of cutting the hip shingle.

One method is to lay the hip shingle parallel with the hip (instead of perpendicular to the eaves) and trim it to shape from the bottom and inner edge, as shown in Fig. 33. This leaves the short grain of the shingle on the inner lower corner, where it is not so liable to damage. A pattern is used for marking the shingles and they are cut with a handsaw, six or eight being held together and cut at the one time.

Sometimes, to avoid so much short grain, the bevel required at the hip is divided between two or more shingles, which makes a great deal more work but leaves the shingles in better condition. The writer has heard this described as the "fantail" method. It is illustrated in Fig. 34. These shingles, also, are cut to pattern, and perhaps the best arrangement is to "turn the hip" with five shingles, two on one side and three on the other, reversing the order for each course. A pattern is, of course, needed for each different shape of shingle, and to avoid confusion it is better to number the shingles as they are cut.

The hips may be shingled a little in advance of the plain shingling in the same way that a brick-layer builds a corner, or they may be carried up with the plain shingling, which necessitates all four sides of the roof being carried up at the same time.

Weaved* hips may also be laid after the plain shingling has all been finished, although the writer has heard the possibility of this denied. It is much the best method of the three as it allows any side of the roof to be shingled separately. It is accomplished by leaving one or more shingles off the ends of the courses; then, after the plain shingling is finished, the hip is carried up by piecing out the courses on each side of it. Of course, care must be exercised to have the courses from each side of the roof match at the hip, and perhaps this is as good a place as any to point out that on roofs of unequal pitch it will be necessary to vary the width

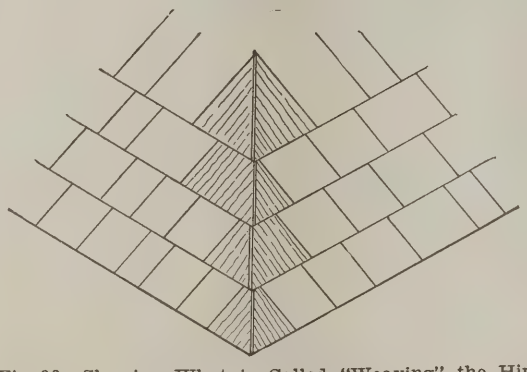


Fig. 32—Showing What is Called "Weaving" the Hip

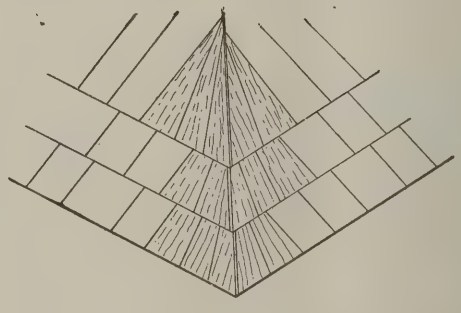


Fig. 34—Appearance of the "Fantail" Hip

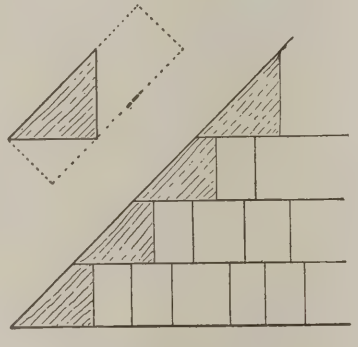


Fig. 33—Hip Shingles Running Parallel with Hip

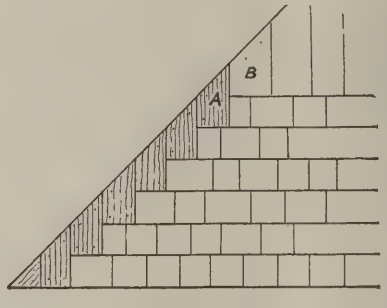


Fig. 35—Style of Hip Suitable for Steep Pitch

Some Aspects of Modern Shingling—Showing Various Styles of Hip Treatment

*Woven hips may be the correct term but the writer has never heard it used.

of the courses on one side or the other in order to have them do so.

A method of shingling hips that used at one time to be very popular in certain sections is shown in Fig. 35. In this method the hip shingle, instead of being cut to a point, is allowed to run down to the course below, which does away with the short grain and the tendency to split.

The writer feels that Fig. 35 may not be as clear to the novice as he would like to have it, and it may help some to mention that the shingles *A* and *B* of this figure both belong to the same course, and are in the same plane. If the lower end of shingle *A* was cut off to line with course *B*, then course *B* would be the same as any course in Fig. 32, excepting that the outside shingle would be slightly thinner than the others. Perhaps the easiest way to understand Fig. 35 would be to look at Fig. 32 and imagine the last shingle in each course extending down to the course below it.

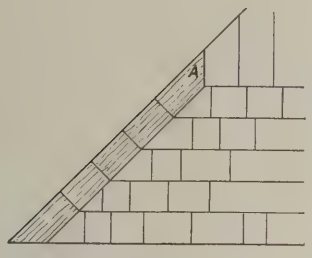


Fig. 37 — Method of Fitting the "Boston Hip"

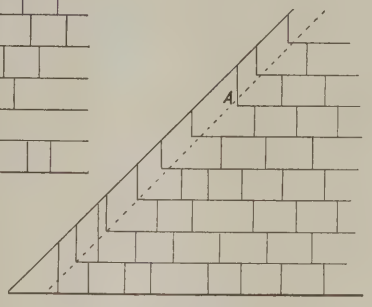


Fig. 38—Lower Courses of Hip Trimmed Ready for Shingling



Fig. 36—Appearance of the "Boston Hip" on a Roof

This method seems better suited to steep roofs than those of low pitch, and the appearance of the finished hip, though rather unusual, is not displeasing. The hip shingles must all be of the same width and should be of such a width as to cover the diagonal line of the hip from one course to the other, as shown in the drawing. If for any reason shingles of this width are not obtainable, two shingles may be used, each one-half of the required width, and a variation of the design may be obtained by placing the inner shingle so that it extends only half-way down the course below. This I think may be understood without the aid of a separate drawing. The center line of joints of this hip are broken, as in Fig. 32, and the lower ends of the shingles must be nailed.

We will close this chapter on hips by a description of the "Boston hip," pictured in Fig. 36, which is perhaps the most popular style of all.

There are some variations of this hip, the easiest one to apply being that in which the plain shingling is carried out to the corner of the hip and the hip shingles are then laid over it in the same manner as already explained for laying a shingled ridge. This is not a true Boston hip and is more properly termed shingled hip.

The correct method of laying the Boston hip is shown in Fig. 37, where it may be seen that the upper end of the hip shingle is cut to fit against the side of the plain shingle in the course above (as shown at *A*) instead of being laid over it. This gives a much neater appearance to the finished hip, which is of some importance in first-class work or in work that is close enough to the ground to be easily examined.

The writer's method of laying this hip differs considerably from that usually advocated, but it is the one he has found to be the quickest and easiest. Do the plain shingling first, stopping the courses about 4 or 5 in. from the center of the hip, but making no effort to get them exact. The double course at the eaves should be fitted as carefully as if no shingles were to be laid over it. After the plain shingling is finished, snap a chalk line down each side of the hip at the width you have decided upon for the hip shingle. This is usually 4 in., though it may vary from 2 to 5 in., according to circumstances, the wide shingle being used as a large plain roof and the narrow one on such work as the hips of a small tower or octagonal summer house.

The writer is of the opinion that the appearance of the hip is improved, especially where wide shingles are used, by tapering the width of the hip shingles so as to make them smaller at the top. The tapered hip involves no extra work, and is worthy of trial.

Fig. 38 shows one side of the hip as it appears after the line for the hip shingle has been struck. The first move is to piece out, or trim back, the ends of the plain courses so as to bring their lower corners to the line. The trimming is best accomplished with the aid of a long paring chisel about 1½ in. wide, and has already been done on the first three courses of Fig. 38. Where the plain shingling does not extend to the line, as at *A*, a narrow shingle must be laid to fill out, and sometimes it is necessary

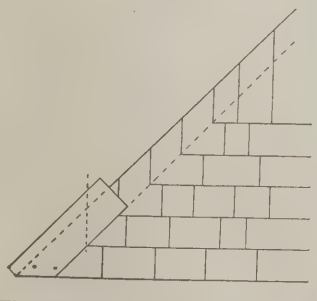


Fig. 39—Showing the Beginning of "Boston Hip"

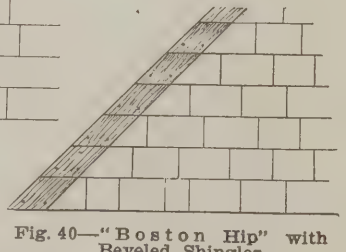


Fig. 40—"Boston Hip" with Beveled Shingles

Some Aspects of Modern Shingling

to split a piece off the shingle already laid in order to have the narrow shingle of a reasonable width. Only those courses are trimmed that can be reached without moving.

The shingles to be used for covering the hip must, of course, be wide enough, but do not need to be of the exact width. The first hip shingle laid must be cut on the lower edge to coincide with the edge of the roof as may be seen in the photo, Fig. 36. After the lower edge has been cut the shingle is laid to the line and fastened in place with a couple of nails, its upper end extending over the course against which it is to fit, as shown in Fig. 39.

The upper end is now trimmed off with the chisel at the dotted line and two more nails are driven in where they will be covered by the following shingle. The shingle now being firmly nailed, its outer edge is trimmed to the bevel of the hip, after which the shingle on the other side is laid and fitted in the same manner. The joints up the center of the hip should be broken, as in Fig. 32, and to achieve this the first shingle in the second course must be laid on the far side of the hip, or immediately following the shingle just laid. This laying of two shingles in succession on each side of the hip is sometimes a little puzzling to the novice, but he soon sees the reason for it.

One variation of the Boston hip is that in which all the hip shingles are beveled on the lower edge so as to line up with the plain shingling, as in Fig. 40. This entails a lot more work, but the idea is sometimes of use in ornamental shingling where something special is required. Another method is to cut the hip shingle to fit against the *second*, instead of the *first*, course above. This is useful where the roof is steep and the shingling is laid with narrow exposure to the weather, in which case the hip shingle, if cut as in Fig. 37, will be too short to make a satisfactory job.

(*To be continued*)

Hydrated Lime Plaster

The use of hydrated lime plaster for scratch and brown coats is gradually growing in favor with architects and builders. Up to 15 or 20 years ago, it will be recalled by some of the older contractors, that when any interior plastering was to be done, use was always made of lump lime, sand and hair. In those days it was necessary to slake the lime after it was delivered on the job. This operation of slaking often required several days to complete, and was looked upon as inconvenient.

Hydrated lime plaster, has, however, been in the market for several years, and gives all the advantages in finished walls of old-fashioned lump lime, but eliminates the inconvenience, for hydrated lime is delivered on the job slaked all ready for the addition of sand and can be mixed and applied with the same convenience as other plaster in the market to-day.

Another point in favor of hydrated lime plaster is that it is a nonconductor of sound. Acoustical experts are agreed that old-fashioned lime plaster and lath was the best nonconductor of sound, and as hydrated lime plaster gives the same good results that were formerly accomplished with lump lime, architects and builders are quick to grasp the value of this material for residences, churches, school buildings, hospitals and all other buildings where quiet conditions are desirable or good acoustics are essential.

The advantages to be gained by the use of this material warrant the consideration of all builders, as its real value can be determined by the increase in tonnage.

Value of Brick and Tile Products

The value of the brick and tile products of the United States in 1915, according to the United States Geological Survey, was $125,794,844. Three varieties of brick and tile and miscellaneous products increased in value in 1915 compared with 1914. Front brick, valued at $9,535,536, increased $245,913, or nearly 3 per cent over 1914; drain tile, valued at $8,879,264, increased $357,225, or 4 per cent; fire brick, valued at $18,839,931, increased $2,412,384, or nearly 15 per cent; and miscellaneous products, valued at $3,716,944, increased $551,130, or 17 per cent. There was a decrease of the total product of about 3 per cent.

The product that showed the greatest decline was sewer pipe. Common brick and terra cotta also showed decrease compared with 1914. The decrease in these industries occurred during the early months of the year, but the conditions improved during the last three or four months of the year, the year closing with bright prospects for 1916.

Another Mammoth Apartment House

Plans have recently been filed with the Bureau of Buildings for the borough of Manhattan, New York, for another notable addition to the group of artistic structures to be erected in the vicinity of the Grand Central Terminal. According to the plans, the project is to be carried on by the New York Central Railroad, and the structure will cover the entire block bounded by Forty-eighth and Forty-ninth Streets and Lexington and Park Avenues. It will be twelve stories in height and cost $2,500,000. The site measures 405 ft. on each street and 200.1 ft. on each of the avenues.

When completed it will be the largest apartment house in the city, covering an area of over 32 lots, or more than two acres of ground. The present largest apartment house is the Belnord, which covers 17 city lots. The new structure has been designed by Whitney Warren and Charles D. Wetmore, who planned the new Grand Central, as well as all of the buildings in that zone controlled by the railroad company.

Condition of the Building Industry

According to the report of the Chamber of Commerce of the United States, issued on Aug. 13, the building industry is stated to be in generally excellent shape. It is, in the opinion of the committee, the best barometer of general business, since building in the country districts means the extensive use of materials in almost every line of commercial business. Despite the high prices of material, the committee report concludes, the building outlook continues good.

CORRESPONDENCE

A Department Where Those Interested Can Discuss Trade Topics—Every Reader is Invited to Participate

Rules for Finding Lengths and Bevels of Rafters and Braces

From D. W. Daley, Parkersburg, W. Va.—I noticed in the July issue of THE BUILDING AGE a table by W. S. Wilkin for finding the lengths of common rafters, and I am sending herewith some figures which I used many years ago. While working as a draughtsman in a steel plant, I used the table here given for the purpose of obtaining the lengths of braces, etc. A portion of the information is copied from "Kidder" and a part of it is copied from "Ellis." I am sending the sketches, table, etc., as I feel sure the information will be useful to many readers of the paper.

Referring to the diagrams, the lines *AB* and *BC* in Fig. 1 represent the walls at the angles of a building; *BE* is the seat of the hip-rafter, and *GF* of a jack-rafter. Draw *EH* at right angles to *BE*, and make it equal to the rise of the roof; join *B* and *H* and *HB* will be the length of the hip-rafter. Through *E* draw *DI* at right angles to *BC*. Upon *B* with the radius *BH* describe the arc *HI*, cutting *DI* in the point *I*. Join *B* and *I*, and extend *GF* to meet *BI* in *J*; then *GJ* will be the length of the jack-rafter. The length of each jack is found in the same way—by extending its seat to cut the line *BI*.

From *F* draw *FK* at right angles to *FG*; also *FL* at right angles to *BE*. Make *FK* equal to *FL* by the arc *LK* or make *GK* equal to *GJ* by the arc *JK*; then the angle at *J* will be the top bevel of the jack-rafters and the one at *K* the down bevel.

Now in backing a hip-rafter, proceed as follows: At any convenient place on *BE*, as *O* in Fig. 1, draw the line *MN* at right angles to *BE*. From *O* describe a circle tangent to *BH*, cutting *BE* in the joint *S*. Join *M* and *S*; also *N* and *S*, then these lines will form at *S* the proper angle for beveling the top of the hip-rafter.

A second method for finding the lengths of jack-rafters may be described as follows: Lay the rafters side by side and square over a line at one end as at A-A^2 of Fig. 2. Then from A^2-B^2 either snap a chalk line or draw a line with a straight-edge. Where this line cuts the face of each rafter, is its length on the longest side. Now having found the bevel as described in method No. 1, apply the bevel to the edge of each rafter and mark the bevel cuts as shown in Fig. 2. In the case of end jacks in irregular roofs, mark the bottom ends to the same angle as the roof is in plan instead of "square," as shown in diagram and measure the length of the common rafter up from this point.

For each 2 ft. the building is wide, the seats of hip and valley rafters is 1 ft. 4 31/32 in., as shown in Fig. 3, which measurement use for the run and the same rise used on the common rafters. The same number of runs will give the length required. This is for intersections of equal pitches.

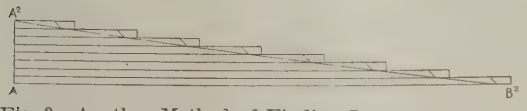


Fig. 2—Another Method of Finding Lengths of Jack Rafters

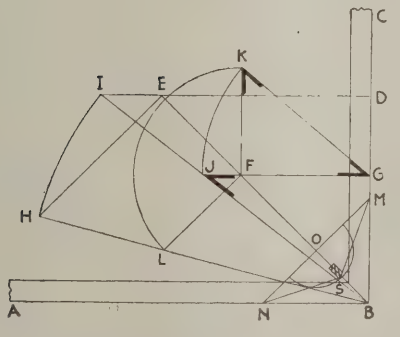


Fig. 1—One Method of Finding Lengths and Bevels of Rafters; also Method of Backing a Hip Rafter

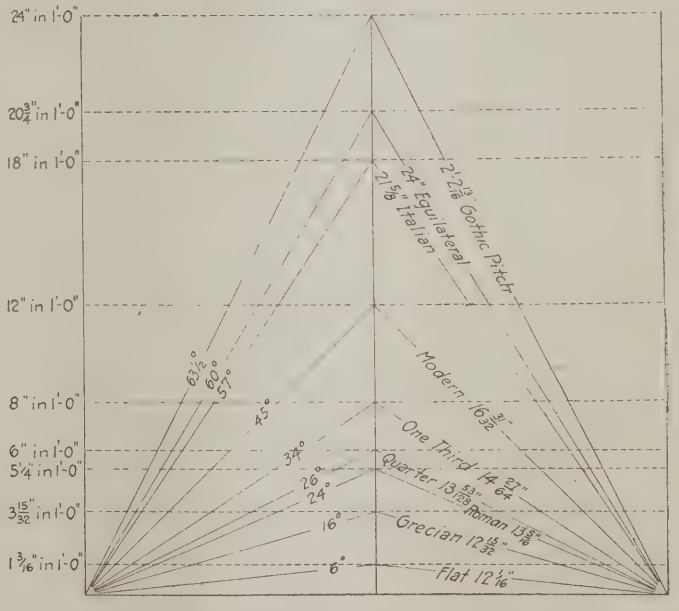


Fig. 3—Showing Seats of Hip and Valley Rafters in Roofs of Different Pitch

Rules for Finding Lengths and Bevels of Rafters and Braces

The table referred to in the early part of my comments is presented herewith, the figures being such as to meet all the stated requirements.

Rise or Run in Feet	Rise or Run in Inches	Rake in Feet and Inches of Common Rafters	Rake in Feet and Inches of Hip and Valley Rafters
The Rise and Run May be Reversed		Length of Common Rafters for Each 1 Ft. of Run	Length of H. & V. Rafters for Each 1 Ft. of Run
1 ft.	1 in.	1 ft. 0 5/128 in.	1 ft. 0 5/256 in.
1 ft.	2 in.	1 ft. 0 21/128 in.	1 ft. 0 5/64 in.
1 ft.	3 in.	1 ft. 0 47/128 in.	1 ft. 0 3/16 in.
1 ft.	4 in.	1 ft. 0 83/128 in.	1 ft. 0 5/16 in.
1 ft.	5 in.	1 ft. 1 in.	1 ft. 0 1/2 in.
1 ft.	6 in.	1 ft. 1 53/128 in.	1 ft. 0 23/32 in.
1 ft.	7 in.	1 ft. 1 57/64 in.	1 ft. 1 31/32 in.
1 ft.	8 in.	1 ft. 2 27/64 in.	1 ft. 1 17/64 in.
1 ft.	9 in.	1 ft. 3 in.	1 ft. 1 37/64 in.
1 ft.	10 in.	1 ft. 3 79/128 in.	1 ft. 1 29/32 in.
1 ft.	11 in.	1 ft. 4 9/32 in.	1 ft. 2 9/32 in.
1 ft.	12 in.	1 ft. 4 31/32 in.	1 ft. 2 11/16 in.
1 ft.	13 in.	1 ft. 5 11/16 in.	1 ft. 3 7/64 in.
1 ft.	14 in.	1 ft. 6 7/16 in.	1 ft. 3 31/64 in.
1 ft.	15 in.	1 ft. 7 13/64 in.	1 ft. 4 3/32 in.
1 ft.	16 in.	1 ft. 8 in.	1 ft. 4 31/64 in.
1 ft.	17 in.	1 ft. 8 51/64 in.	1 ft. 4 63/64 in.
1 ft.	18 in.	1 ft. 9 5/8 in.	1 ft. 5 31/64 in.
1 ft.	19 in.	1 ft. 10 15/32 in.	1 ft. 6 1/64 in.
1 ft.	20 in.	1 ft. 11 21/64 in.	1 ft. 6 17/32 in.
1 ft.	21 in.	2 ft. 0 3/16 in.	1 ft. 7 3/32 in.
1 ft.	22 in.	2 ft. 1 1/16 in.	1 ft. 7 39/64 in.
1 ft.	23 in.	2 ft. 1 15/16 in.	1 ft. 8 13/64 in.
1 ft.	24 in.	2 ft. 2 13/16 in.	1 ft. 8 49/64 in.

Trouble With Glued-up Work

From W. M. D., Baltimore, Md.—I noticed in one of the back numbers of THE BUILDING AGE that a correspondent had trouble with work which he had glued up. He asked why the work was not straight after the clamps were removed, as he had jointed and fitted it perfectly straight before gluing.

For his benefit and that of the readers of the paper who have not had much experience in this line, I will endeavor to explain the difficulty. The trouble occurs mostly in gluing up such work as table tops and the like, where the clamps are opened out 3 ft. or 4 ft. or more, with 3 or 4 joints. I am presuming that iron clamps are used by the majority of carpenters, and if they will take the trouble to lay three or four 12-in. boards on a couple of trestles, put on two or three clamps and tighten them up, it will be found that the backs of the clamps have bowed down and the boards have followed the shape of the clamps as a consequence. If the work is glued up in that shape it will remain so when the glue has dried and the clamps have been removed.

My remedy is to use two sets of clamps—one set on the top and one set on the bottom. First put on the top clamps and draw the work together, then lay a straight-edge across the work which will invariably be bowed up; after this has been done, put on the bottom clamps. Tighten them up and loosen up the top ones until the straight-edge and the work come in line. See to it that all the clamps are tight and the work straight across, then when the glue is dry and the clamps are removed, the work will be straight.

In jointing up such work it is necessary to make the joints fit to a hair from end to end. The first piece should be jointed straight and square on the edge; the piece that is near to it should be fitted by a straight edge across both pieces, regardless of the square.

I usually dowel the joints, placing the dowels about 18 in. apart. The dowels should have a small groove or saw kerf the full length of the dowels in order to let out the air. If one of them becomes air-bound no power will drive it in, so precaution is necessary.

In concluding, I would say that the glue used should be comparatively thin. The draught should be shut out of the shop and the gluing should be done in a hurry.

Shingling Staging

From D. P. Barry, Redford, N. Y.—In looking over the comments in regard to shingling on the Pacific Coast from "G. L. McMurphy," and which appeared in a recent issue of the paper, I am constrained to give a description of what I regard as the simplest and quickest made shingling staging. I shingle to two or three lines, and there are no shingles that do not need trimming. It is of no consequence that the butts are somewhat uneven; often a lot of trimming is needed to get the butts approximately in line.

A straight-edge is out of the question on a building 40 to 200 ft. long—a straight-edge keeps the shingler moving too much. Two good shinglers on a plain roof with good shingles will lay 8000 to 10,000 shingles in a day, but 2500 to 3000 shingles are all anyone should aim to lay. There is no reason, to my mind, why the carpenters' trade should be singled out for rapid transit work. It is nerve racking any way you take it.

Discussion of Building Methods

From J. P. W. Lane, Kans.—In looking over the July issue of THE BUILDING AGE I notice D. P. Barry of Redford, N. Y., gives me quite a send-off in regard to the construction of a box sill which I described some time ago. Now, if I had been in the correspondent's place I fear I should not have made any mention of his sill No. 1 with the 2 x 4 on the sides for the joists to rest upon where most of the weight comes. His No. 3 is not much better; in fact in some respects it is worse to my way of thinking because doubling the 2 x 8-in. flat on the wall will cause them to rot out much sooner than if single and can be no better than if single for strength if laid on a solid wall. Again the 2 x 8 in. he cuts up to which to nail them does not touch the studs if 2 x 4 in. are used. We use cross bridging to keep the joist from twisting.

His No. 4 solid sill is all right, but it will rot sooner than the sill shown in my sketches and is not any stronger after he has filled it full of holes. Another thing, he cannot fasten his studs as securely if he simply toe-nails them on top, and the cost of labor is at least ten times as large with nothing gained.

In regard to his sills I have talked with two builders of established reputation in the trade and their opinion is much the same as mine. I do not profess to know it all, but I have a boy whom I taught to be a carpenter. He is now a foreman and working on buildings that involve an expenditure running up into big figures. He draws, I expect, as big a check weekly as the correspondent in question, and he was born and raised in Lane, Kan.

In regard to squares a 16-in. tongue is good

enough for me or for anyone if he knows how to use it. I have owned a 16-in., a 17-in. and an 18-in., but it so happens now that I have only three squares and they all have 18-in. tongues. My boy took my 16-in. tongue with him when he left home.

I am inclined to doubt if the correspondent ever put on laths diagonally or he would not say there was no sense wasting time lathing that way. In my judgment, it takes no more time and every scrap of lath can be used. I would prefer boxing inside and out if it were the same price but how many people will pay for it except in a cold climate. Lathing diagonally on boxing put on horizontally makes the best job of plastering of which I have knowledge and that is the reason I prefer it on the inside.

I would say that I am not greatly impressed with the correspondent's sill and threshold combined, because when it becomes worn it will require too much work to renew it.

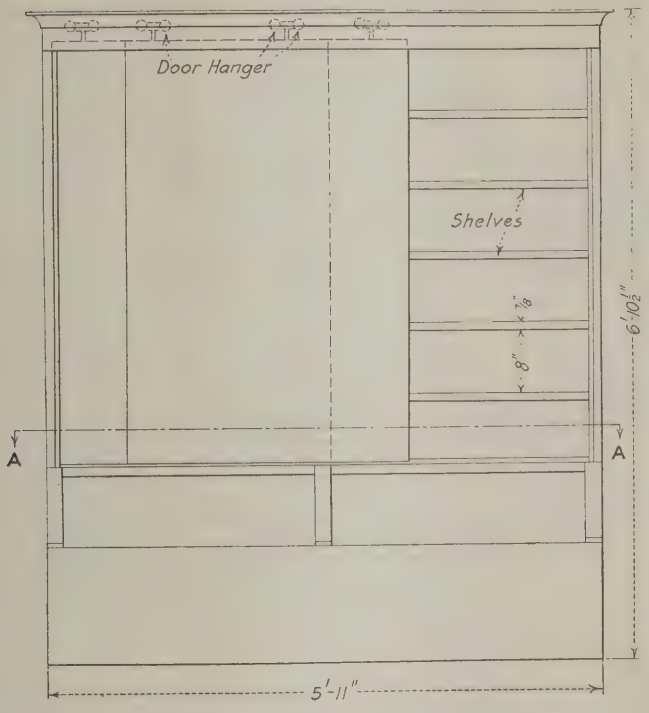


Fig. 1—Front Elevation of the Closet with Door Pushed to One Side Showing the Shelves

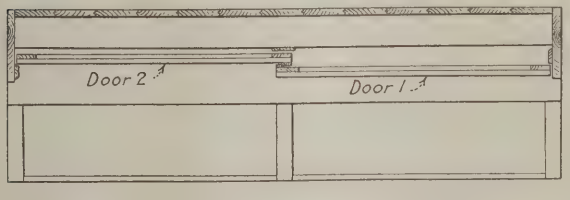


Fig. 2—Section on Line A-A of the Elevation

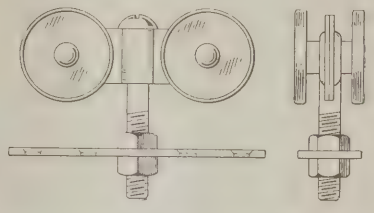


Fig. 4—Details of the Hangers Used

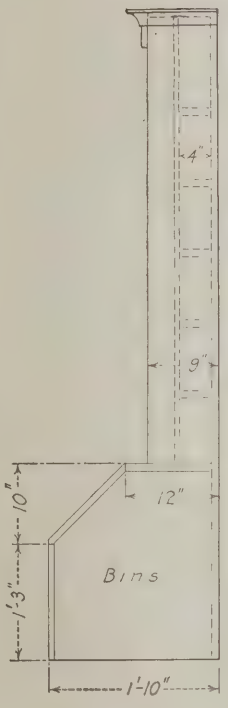


Fig. 3—End Elevation of the Closet

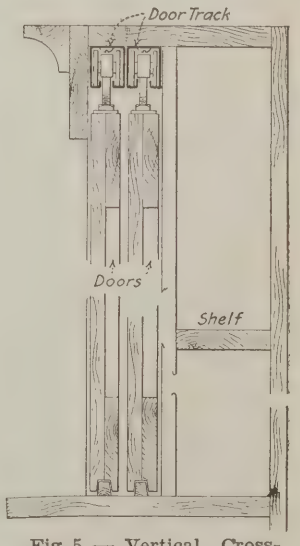


Fig. 5 — Vertical Cross-Section of Closet

Details of a Fruit Closet—By E. J. G. Phillips

Details of a Fruit Closet

From E. J. G. Phillips, Aurora, Ill.—A fruit closet in which every jar is in sight, is the ideal way to store the winter's supply. This can be easily accomplished without taking up any more space than the ordinary shelves, by building a closet like that shown in Fig. 1 of the illustrations. If made to the dimensions given, it will have a capacity of 108 quart fruit jars. Each shelf, which is 4 in. deep by 69 in. long inside, accommodates 18 fruit jars set in a sigle row. Six of these shelves are built into the closet and every jar of fruit is visible when the doors are opened. If it is customary to use pint or two quart jars, the shelves should be built accordingly. Shelves for two-quart jars should be 5 in. deep with a space of 10 in. between the shelves. Pint jars require only 6 in. between the shelves, while 8 in. is required for quart jars. The two bins at the bottom provide space for potatoes or other vegetables and also gives to the closet a wide base to prevent any possibility of tipping. It is unnecessary to build a bottom in these bins if the closet stands on a good floor.

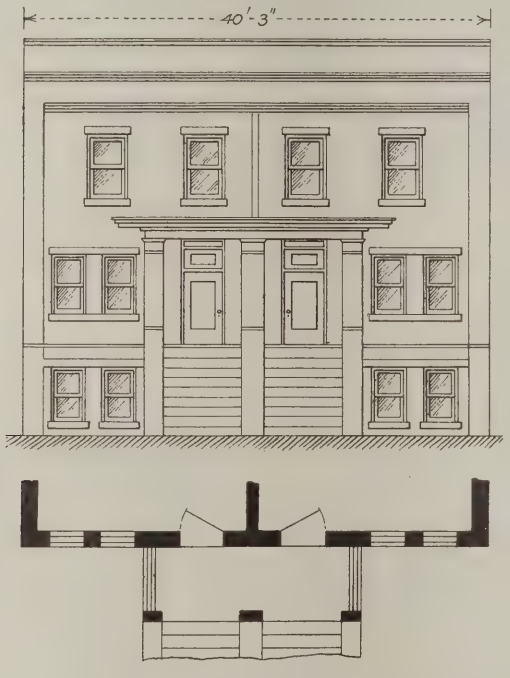
The front of the fruit jar shelves is closed by two sliding doors. These doors slide in parallel tracks attached to the top board of the closet as shown in Fig. 5. Door No. 1 slides in the outside track and door two slides in the inside track. A facia strip in front of the tracks extends down below the top of the doors closing the top tightly. Fig. 2 shows plainly the details of construction. The doors may be very simply constructed by using one thickness on ⅝-in. beaded ceiling held together by a strip across the top and bottom. Braces such as would be necessary in a hinged door are not required in the sliding door. They are hung from the top and therefore are not subject to sagging or such strains as would be produced in a door hung from the sides. A narrow

strip attached to each side vertically between the top and bottom strips will fill out the thickness of the doors where they overlap at the center and close this space tightly. The hanger shown in Fig. 4 is of small size built especially for very light doors. It rolls in a track 1⅜ in. wide by 1¾ in. high.

If this closet is built of yellow pine and given a natural finish, it will be quite as pleasing in appearance as it is useful.

Elevation for Ten Room Twin House

From T. T. Carter, Bluefield, W. Va.—I am sending a sketch representing a front elevation of the ten-room twin houses concerning which the correspondent made inquiry in a late issue of the paper. This front has been satisfactorily built here in brick, stucco and in concrete blocks. The space mentioned by the correspondent above the doors for the windows could be evenly divided and doors with glass panels with transoms would give light and ventilation for the halls and stairways.



Elevation for Ten-Room Twin House

Some Comments on Shingling

From Edward H. Crussell, California.—I have, of course, been much interested in the various comments upon 'Some Aspects of Modern Shingling" that have appeared in the correspondence columns, and take the first opportunity of answering.

The scaffold bracket of W. M. Spalding, Elmira, N. Y., in the April issue, appears to me to be a satisfactory contrivance and I am glad to know of it.

I think I know why "E. M. P.," Robbinsdale, Minn., in the July issue always recommends the use of the straight-edge in shingling, but never having used, or seen, one of his nailing machines, I am unable to say anything for or against them.

I cannot say that I approve of the method of roof staging of John Upton, La Fargeville, N. Y., in the August issue and I suggest, with all the best intentions, that on his next job he try the method described in the April issue. I assure him that I will not be offended if he does not like the method there mentioned and I hope he will not be offended at my suggestion.

In conclusion I wish to say that the articles are not written in any "I know all about it" attitude. and I hope the readers will feel free to comment upon them in any manner whatsoever, whether to offer new ideas as wrinkles, or criticize anything that has already appeared.

Constructing an Ordinary Shed

From W. M. L., Orange, N. J.—I would greatly appreciate it if Mr. Wilkin or some other practical reader of the paper would furnish information telling how to construct an ordinary shed 12 ft. wide by 18 ft. deep, 9 ft. 6 in. high at the front and 8 ft. high at the rear. In the front are to be 8 ft. x 8 ft. doors.

I also wish to know how the bevels are found.

Floor Plans Wanted for Club House

From S. C. M., Lake Hopatcong, N. J.—Will some of the readers architecturally inclined send to the editor for publication sketches of floor plans suitable for a technical club house for students? The rooms are to be all on one floor, and should include a large reception or meeting room, laboratory, carpenter shop, draughting room and library. The building should be 25 x 75 ft. in plan.

Death of Andrew Richmond

Andrew Richmond, a building contractor of Pittsburgh, Pa., passed away at his home in that city on July 24, at the age of sixty-four. He was born in County Antrim, Ireland, and went to Pittsburgh at the age of eighteen, where he was engaged in business with his son for the past sixteen years.

He was a member of The Builders' Exchange, the Master Builders' Association, the Brick Contractors' Association and the Pittsburgh Chamber of Commerce.

In a recent address before the Southern Forestry Congress, at Ashville, Henry S. Groves, Chief Forester of the United States, emphasized the importance of the timber supply of the South, and pointed out methods by which it may be perpetuated. He stated that 61 per cent of the present hard-wood supply of the country is located in the South, and that many of the most important hard woods are supplied wholly from the Southern forests. He also stated that, at the present rate of cutting, the existing supply of high-grade hard-wood timber will not last many years.

An Apartment House of Stucco Finish

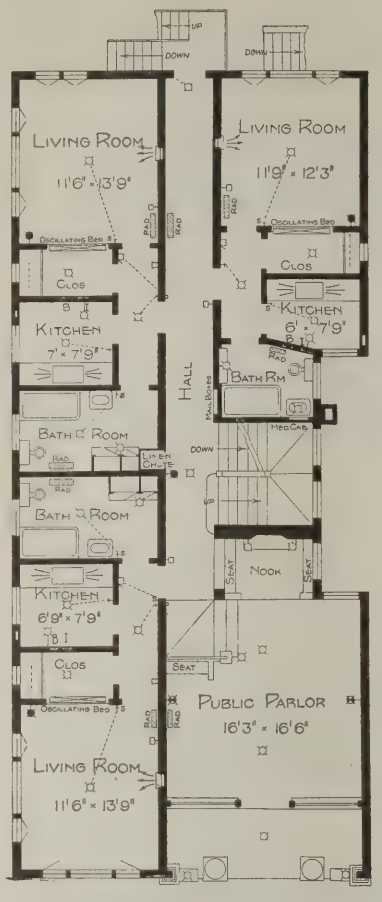
A Compact Yet Convenient Arrangement of Rooms for Eleven Families in a Three-Story Structure

By Charles Alma Byers

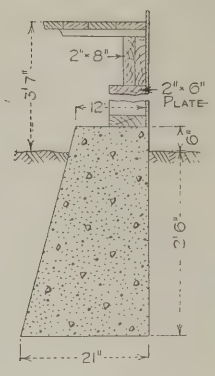
WHILE from the owner's point of view it is solely an investment proposition, the apartment house, to prove a real and lasting success, must receive careful and well-balanced forethought in a number of different directions. In the first place it should be ascertained, with reasonable certainty, that the size and character of the building and its location will enable the collecting of an average revenue sufficient to pay a satisfactory rate of interest on the total amount of the investment, including both the lot and the improvements, with a liberal margin to offset possible vacancies. This phase of the proposition, which, of course, is highly important, is rarely overlooked, although it may often be too carelessly considered to assure safety. But equally important also is the matter of making the building suitably modern and convenient in its interior appointments and attractive in its exterior appearance, so that the apartments may be in demand and periods of vacancy,



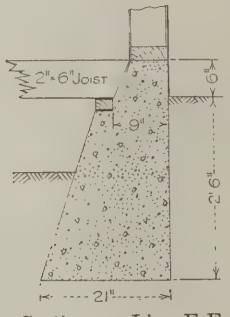
Photographic Perspective of the Finished Building—Architect Albert L. Reed, Los Angeles, Cal.



Main Floor Plan—Scale 1/16 In. to the Foot

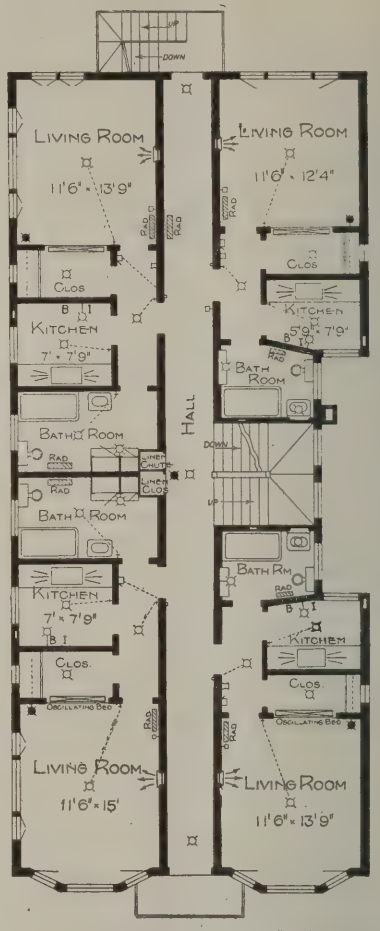


Section Through Foundation Wall on Line A-A

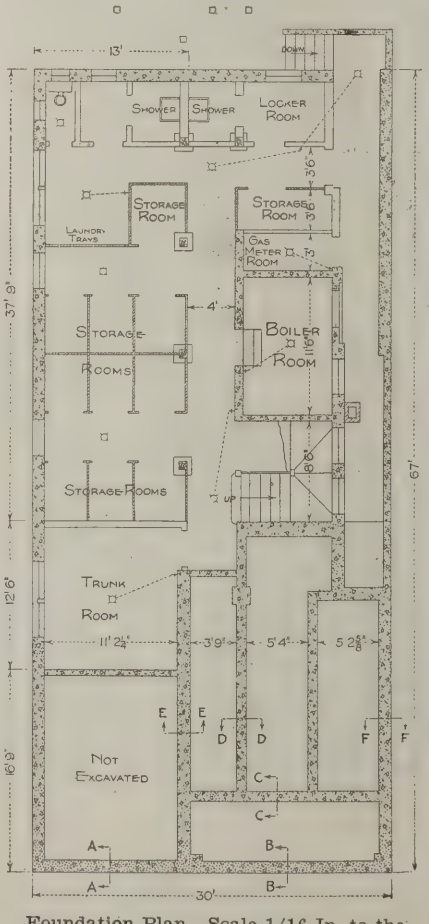


Section on Line F-F.

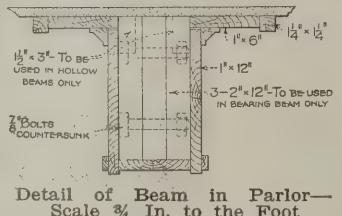
Scale ¼ In. to the Foot



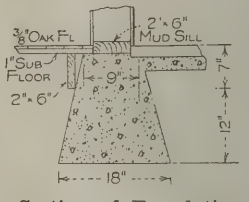
Plan for Second and Third Floors—Scale 1/16 In. to the Foot



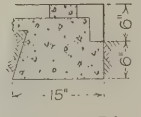
Foundation Plan—Scale 1/16 In. to the Foot



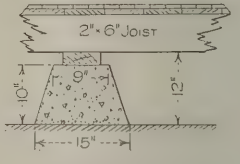
Detail of Beam in Parlor—Scale ¾ In. to the Foot



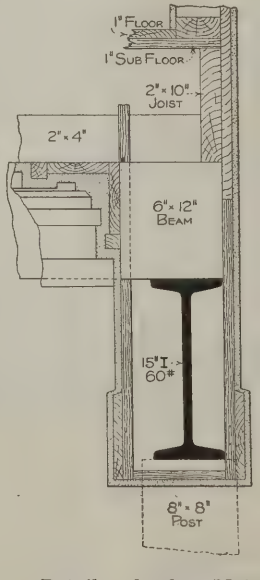
Section of Foundation on Line C-C



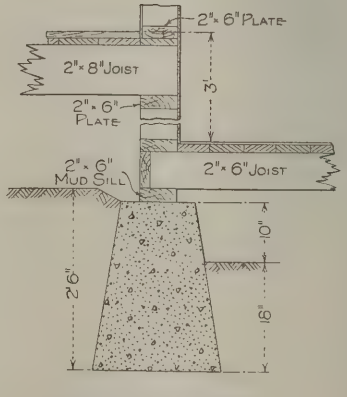
Section on Line B-B



Section on Line D-D



Detail of the Main Entrance Construction

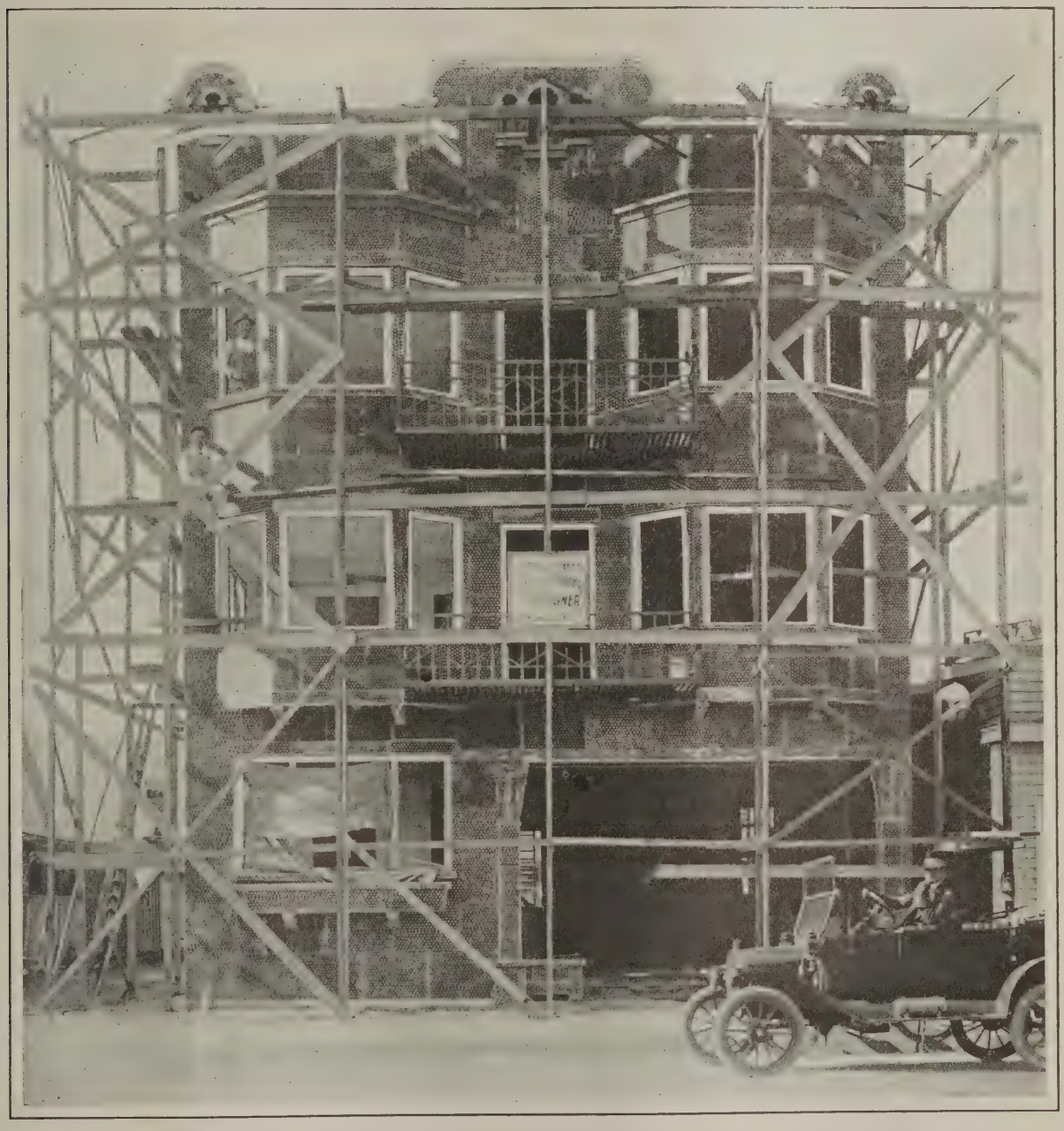


Section on Line E-E—Scale ¼ In. to the Foot

An Apartment House of Stucco Finish—Plans and Miscellaneous Constructive Details

or partial vacancy, thereby minimized. Unless this problem is solved, all previous estimates will count for naught, and the whole undertaking automatically becomes a doubtful speculation instead of a businesslike investment.

The apartment house here shown is neither very large nor elaborate, nor does it represent any very great expenditure of money, but it does constitute a well-balanced investment. Moreover, and which is of greater interest, it is a well-planned building —dignified and mildly attractive in outside appearance and convenient, economical and modern in interior arrangement. In short, it introduces a number of features, both structural and in the way of appointments, that deserve careful consideration by the prospective apartment house builder.



An Apartment House of Stucco Finish—The Building Ready for its Coating of Stucco

The outside walls of the building are of cement stucco, of pure white surface, and the trimming, for the most part, is also white. The foundation is of "poured" concrete, and the roof, which is comparatively flat, having a fall that totals but 18 in., is covered with a tarred-paper composition, the roof area being inclosed with a low coping-wall extension, with a minimum height of 2 ft. On the front a very attractive cornice effect is created by the introduction of two hood-like sections of red roofing tile, separated by a section of perpendicular wall, rounded off along the top edge and pierced in the center by a group of three Mission arches. At each of the front corners there is also a narrower but similar wall section, pierced by a single arch. These arched openings—five in all—are equipped with hidden electric lights, which, together with the two chain-and-brace suspended lighting fixtures of rather elaborate design at the sides of the front entrance, produce at night a most attractive effect.

The front entrance is of the loggia type, the recess being 6 ft. in depth and 16 ft. 11½ in. in width. This area is floored with red brick, laid in herringbone pattern, inclosed with a cement border 8 in. wide, and into the surface of the pillar and pedestal effects at either side of the outer

entrance are set small inlays of hand-made tile. A double door, of square panes of glass, gives access to the interior, and at each side of this doorway is a large plate-glass window, while above both the doorway and the windows is a long transom, divided into three sections. The doors, as well as the framing about both them and the windows, are of plain white oak, finished in a soft bluish-gray shade, or eucalyptus color.

Windows Arranged in Groups of Three

All windows on the front, except those of the entrance, are arranged in groups of three. Beneath the lower group is an attractive window-box, plastered inside and out with Keene's cement, and the four groups above are arranged in shallow bays. Fire-escape balconies project on the front from the second and third floors, and into each of these open French doors. The front and back tiers of windows on the alley side and one tier in the rear end are also groups—the center portion in all such arrangements being a single stationary glass and the side sections being designed as casements, each composed of a single glass panel. All other windows, except those of the closets, are of double casements, but of smaller size, and the closet windows, which are still smaller, are single but open in the same manner.

These casement windows, instead of opening toward the interior, swing outward, and are equipped with rod attachments by which they may be held stationary in any position desired. Where windows of this type open inward it is always difficult to prevent them from admitting water from beating rains, but no such difficulty need be experienced when casements of the outward-swinging type are used, for the buffer strips, or stops, will naturally be on the inside and will cause the water to drain outward instead of toward the inside.

There is an outside iron stairway in the rear, with landings at the different floors, which also serves in emergencies as a fire-escape.

The building is located on a lot that corners on a side alley, convenient access to the rear part of the structure being thereby provided. The lot is 75 x 30 ft. in size and the building covers 86 per cent of this area. It has a frontage equal to the total width of the lot, and a depth of 67 ft., leaving unoccupied margins of 6 in. in front and 7 ft. 6 in. in the rear. On the side opposite the alley, however, there is a small court recess extending to the top of the building, 4 ft. in depth and 19 ft. 5 in. in length.

Arrangement of Rooms

The structure, exclusive of the basement, is three full stories in height. It contains on the ground floor a large public parlor and three complete apartments, and on each of the two floors above are four apartments, making a total of eleven apartments in all. The front entrance leads directly into the parlor, and from one of the rear corners of this room extends, by way of a short flight of steps, a straight, narrow hall, which gives access to the various individual apartment halls on this floor and connects both with the inside stairway and with the outside stairway in the rear. A similar hall, extending the full length of the building, connecting likewise with the stairways and the individual halls, also prevails on each of the floors above. These main passageways are 4 ft. wide in the clear and the entrance halls of the different apartments are approximately 10 in. less in width in the clear. A linen chute, lined with galvanized iron, with a door on each floor, extends from the top floor to the basement, and on the second floor, only, is a small closet, equipped with shelves, for clean linen. A wall drinking fountain and built-in mail boxes are features of the first-floor hall.

The public parlor, which, in the main, is nearly square, contains, in the rear, a small fireplace nook, which is elevated 6 in. above the common floor level of the room. The fireplace is provided with gas connections for a gas grate, and at each side of it is a built-in seat. Both the floor and the walls, including even the ends of the seats, as well as the entire fireplace of this nook are covered with "Batchelder" hand-made tile of light blue, buff and yellow shades. The seats are 16 in. high, and a similar built-in seat, all of wood, faces the entrance from the side of the steps leading to the hall, while into one of the side walls of the room is built a small cabinet for card tables.

Finish of the "Public Parlor"

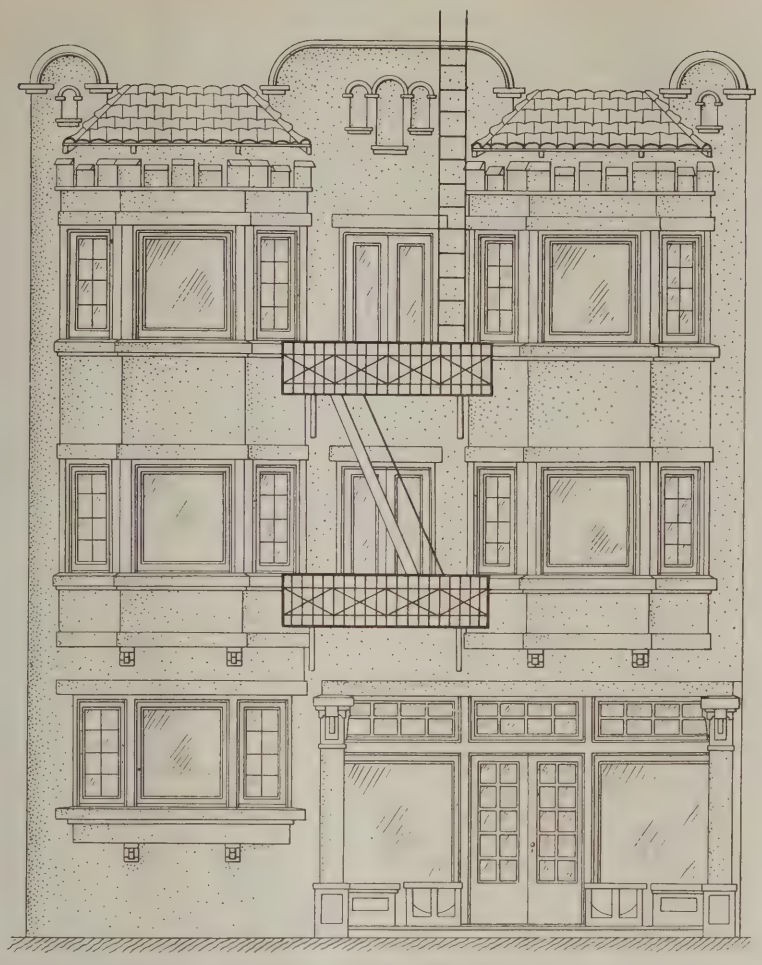
The parlor itself is floored with $\frac{3}{8}$-in. quarter-sawed oak, over two-ply waterproof paper. The ceiling is beamed and the walls are finished with a wainscot and a plate rail. The wainscot extends to a height of 5 ft. 6 in., consisting of five-ply built-up paneling, with battens about 3 ft. apart. The paneling is of select Oregon pine, and slash-grain Oregon pine is used for the remainder of the woodwork of the room—all of which is finished in a dull eucalyptus color, like the entrance outside.

The ceiling of the parlor—the floor of this room being on a lower level than that of the other first-floor rooms—is 12 ft. high, exclusive of the beams, the beams being approximately 13 in. deep. The ceilings of the halls and all other rooms are 9 ft. in the clear.

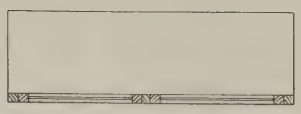
What Constitutes Each Apartment

Each of the apartments consist of a large living room, a "cabinet" kitchen, a bath room and a roomy closet, as well as a private hall which gives direct access to each of these rooms. Aside from the convenience of the arrangement, one of the particularly attractive features of the apartments is found in the number and the quality of their built-in effects. In every case the living room possesses a full-size disappearing bed, of the "oscillating" type; the bath room contains a small but excellent built-in dresser, with cabinets and drawers and a plate-glass mirror, and a medicine case, in the door of which is set a plain mirror 12 x 24 in. in size. The kitchen has a most complete cupboard arrangement along one wall, while in the wall on the opposite side are a broom closet and a disappearing ironing-board. The wardrobe closet is equipped with the usual shelf, pole and hooks. The kitchen cupboard, it should be added, contains, besides the usual sink, drain-board, shelves and drawers, a draught cooler, an ice-box, a bread-board and a tin-lined flour-bin.

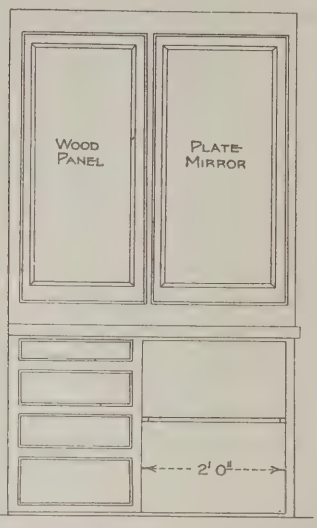
The floors throughout, except in the public parlor, as stated, and in the bath rooms, are of 4 in. No. 1 Oregon pine, over a 1-in. pine sub-floor, two-ply



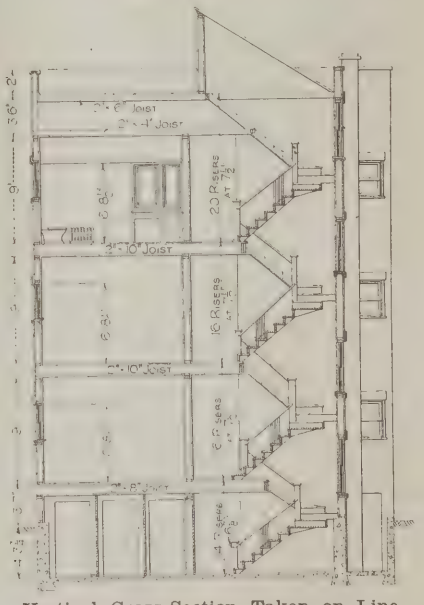
Front Elevation of the Building—Scale ⅛ In. to the Foot



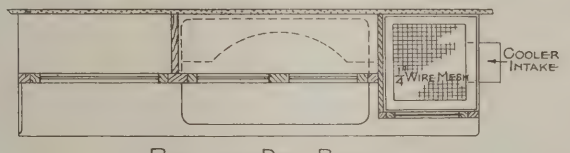
Section Through Panel and Mirror of Dressing Case—Scale ⅜ In. to the Foot



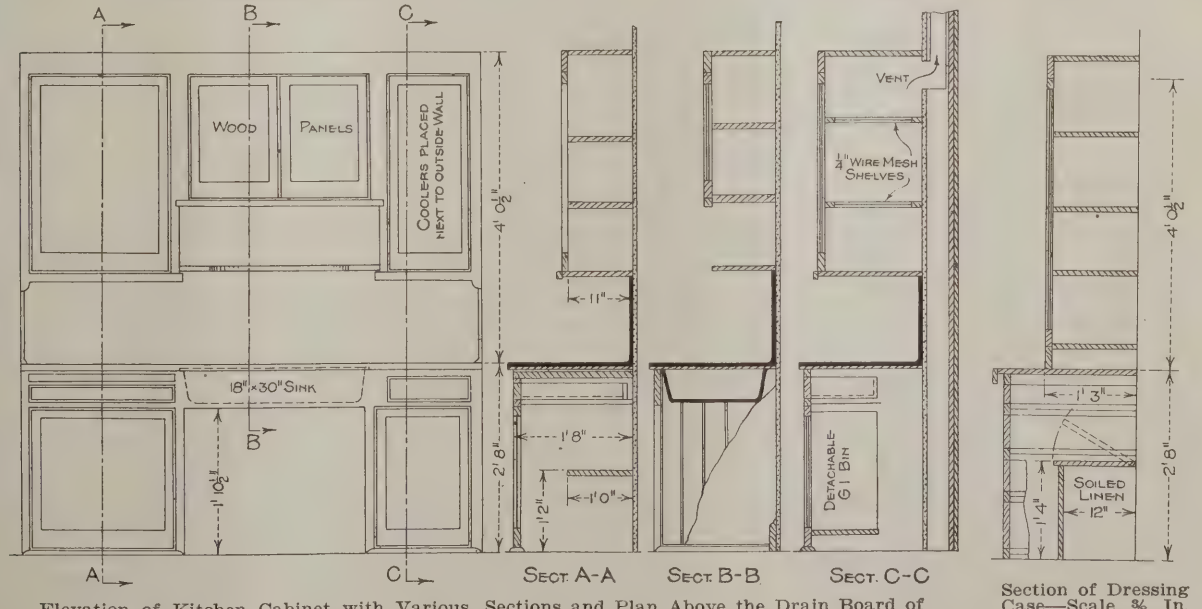
Elevation of Dressing Case in Bathroom—Scale ⅜ In. to the Foot



Vertical Cross-Section Taken on Line of Main Stairs and Bathroom



PLAN ABOVE DRAIN BOARD



Elevation of Kitchen Cabinet with Various Sections and Plan Above the Drain Board of the Sink—Scale ⅜ In. to the Foot

Section of Dressing Case—Scale ⅜ In. to the Foot

An Apartment House of Stucco Finish—Elevation and Various Details of Construction

felt intervening in the case of the second and third stories. In the bath rooms they are of "Flexostone," applied over a 1-in. mesh galvanized rabbit wire, to a thickness of ½ in., and which is turned and continued 6 in. up the walls. The woodwork of each apartment, as well as of all halls, is of Oregon pine, and the walls throughout are plastered.

The Tinting and Finish of Woodwork

The tinting and the woodwork finish is particularly interesting and attractive. The woodwork of the living room and individual hall of three of the apartments, as well as of all main halls, is finished, as in the parlor, in eucalyptus color; of two of the apartments, in mahogany; of four of the apartments, in Circassian walnut; and of the remaining two apartments, in silver-gray stain—the imitation eucalyptus and walnut being done in art grain. The furniture of these different-styled rooms is finished to correspond in color. The woodwork of the kitchens, bath rooms and closets is enameled white. The plastered walls are tinted with "Acme No-Lustre," Tiffany blend, seven different color schemes in all being created. The walls of the public parlor, however, are covered with tapestry paper, of indistinct flower pattern.

Since this apartment house is located in a beach city, on the Pacific Coast, where ocean bathing may be indulged in by the tenants, there are certain features of the basement that deserve special mention to builders located in similar resorts. These consist of locker rooms and showers—one each for males and females—located in the rear end of the basement. In each locker room are four individual lockers, which are built against the wall of one end. In inside dimensions each closet is 4 ft. 3 in. high, 1 ft. deep, and approximately 1 ft. wide—the end ones being a little wider in order to fill out the space. A built-in seat, 16 in. high, extends the full width of the four lockers. The showers supply both hot and cold water. Incidentally, in the rear end of the hall on each floor another type of locker is also provided, equipped with shelves and wood and screen doors, for use for various purposes.

The Basement

The basement also contains eleven individual storage rooms—one for each apartment—as well as a large trunk room, a small meter room, a laundry, a lavatory, and the boiler room. It is reached from both the inside stairway and steps in the rear.

The basement, excavated to irregular depths, covers approximately three-fourths of the building plot. Its maximum ceiling height is 9 ft. and its minimum, for the used portion, is 7 ft. It is walled with poured concrete, which, with the piers, consists of good Portland cement, river sand and crushed or broken rock, in a 1-2½-4½ wet mixture, the rock being graded to pass through a 2-in. ring. The flooring consists of concrete also, for which a 1-3/5 mixture is used, and over this concrete, which is 3½ in. thick, is a surface of ½ in. of 1-2 topping, troweled to a smooth finish. Sand screened through a No. 16 mesh screen is used for this surface coat. The floor is naturally sloped toward certain drain pipes.

The entire unoccupied area in the rear of the building, as well as the court on the side, is covered with concrete and surfaced in the same manner and of the same composition as is the flooring of the basement. This work, however, is marked off into blocks 4 ft. square.

The partition walls of the boiler room are of concrete, but the other basement partitions are, for the most part, of single board or frame construction, all timber being painted white. The walls of the shower rooms are plastered with Keene's cement, but the concrete walls elsewhere, as well as the ceiling, are covered with plaster of ordinary quality. The chimney rising from the boiler room is constructed of hard-burned brick, plastered on the outside and lined on the inside, which is 8 x 12 in. in dimensions, with terra cotta. The basement walls extend some distance above the ground level, and this enables a number of small windows to be used to aid in lighting the interior.

Walls and Piers of Basement

The walls and piers of the basement combine to create the foundation of the building. The piers support 8 x 8-in. posts, set in cast-iron shoes. The mud sills are of 2 x 6-in. redwood, and the girders —two rows running lengthwise of the center—are of 8 x 8-in. Oregon pine, built up from four 2 x 8-in. pieces. The studs and joists are as follows: Underpinning studding, 2 in. x 6 in.; first-story studding (bearing), 2 in. x 6 in.; first-story studding (non-bearing), 2 in. x 4 in.; second- and third-story studding (bearing), 2 in. x 4 in.; second- and third-story studding (non-bearing), 2 in. x 3 in.; first-floor joists, 2 in. x 8 in.; second- and third-floor joists, 2 in. x 10 in.; ceiling joists, 2 in. x 4 in.; and roof joists, 2 in. x 6 in.—all of Oregon pine and set 16 in. on centers.

Double joists are used under all partitions, and all door studs, as well as headers over all openings, are double, while all openings of 3-ft. span are trussed. All plates are single at the bottom and double at the top; and two rows of bridging for each floor, of 2 x 3-in. timber, run the entire length of the building. Surfaced redwood is used for all window sills and casings, outside, and all other framing material is of clear Oregon pine. The partitions are fire blocked in accordance with the local city ordinance. To bridge the weight of the second- and third-floor extension there is used over the front entrance a 15-in. 60-lb. "I" beam, boxed in, and which is supported by two 8 x 8-in. plastered-in. posts. This steel beam in turn carries a 6 x 12-in. wood beam.

Covering of the Exterior of the Building

The entire exterior of the building, as well as all floors and the roof, are sheathed with 1 x 6-in. Oregon pine, surfaced one side, and laid with the surfaced side down, the floor sheathing, or subfloor, being laid diagonally to the joists.

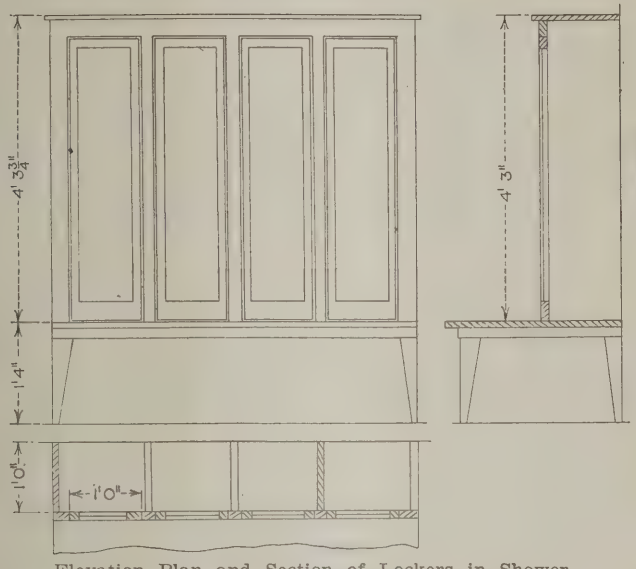
Over the exterior sheathing is used a new type of plaster-board, and over this is loosely stretched and nailed a wire netting. To this is applied the stucco consisting of a 1:2 mixture of cement mortar 1 in. thick, finished with white cement and white silica sand.

For the interior the plaster is applied over ordinary wood and metal lath, the metal lath being used to cover the ceilings, soffits of the stairs and

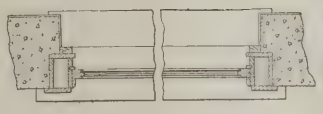
the walls and ceilings of the halls, as well as the penthouse inside and out; wood lath is used elsewhere. The dadoes of the kitchens and bath rooms are finished with Keene's cement, blocked off in the latter in 8-in. squares, and "Victor" hard wall plaster is used elsewhere.

The roof and penthouse are covered with 5-lb. three-ply felt, well mopped between layers with hot tar, and over this is placed a single layer of "Paraffine" rubber-sanded roofing.

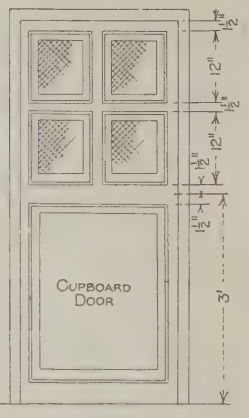
The building is heated throughout from a base-

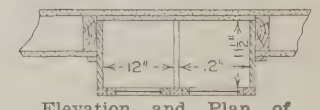


Elevation Plan and Section of Lockers in Shower—Scale ⅜ in. to the foot

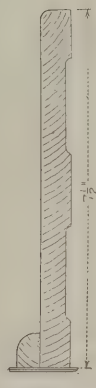


Horizontal Section Through Double Hung Windows in Basement—Scale ¾ in. to the foot

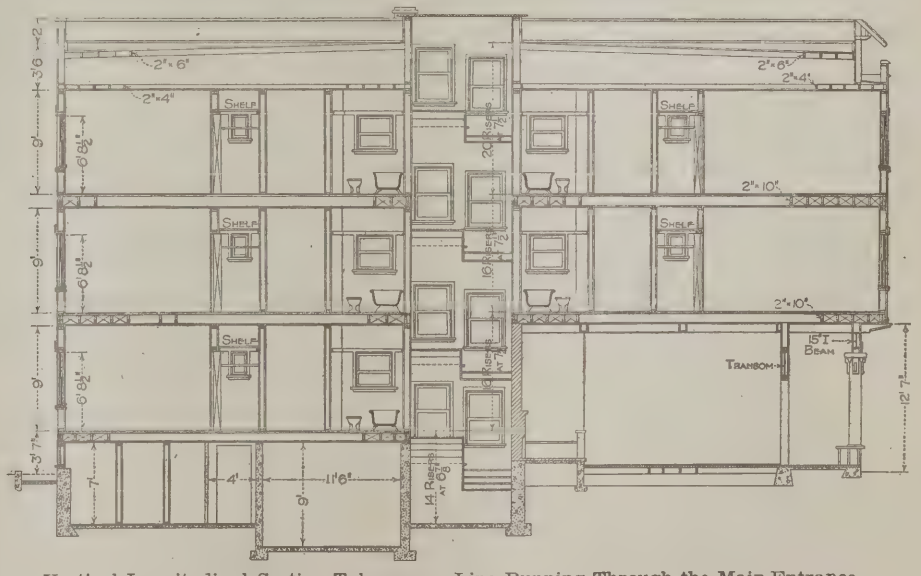




Elevation and Plan of Locker in Rear Hall—Scale ½ In. to the Foot



Section of Base—Scale 3 in. to the foot



Vertical Longitudinal Section Taken on a Line Running Through the Main Entrance, Public Parlor, Main Stairs, Bath Room and Rear Living Room. Scale 1/16 In. to the Foot

An Apartment House of Stucco Finish—Miscellaneous Constructive Details

ment furnace, the system making use of an "Ideal Sectional" boiler and a "Johnson Whirlwind" burner. Radiators are provided in the public parlor and the main halls and in each of the living rooms and bath rooms. A ventilation system, providing for a register in each living room, is also a feature of the building, with galvanized iron pipes leading to the roof. And hot and cold water is supplied to all kitchens and bath rooms.

The total cost of the building, including everything represented in the investment except the lot and the furniture, was exactly $12,970.64. It was constructed almost entirely by day labor, included in this being the concrete work, the plastering, the painting, etc. The plumbing, as well as the heating and ventilation plants, however, were installed, under sub-contract, by S. S. Ford, 58 Lime Avenue, Long Beach, Cal., at a price of $3,800. The tile work in the public-parlor nook was likewise contracted, it being done by the manufacturer at a cost of $375. While the other items cannot be segregated to any extent, it may be stated that the excavating and concrete work amounted to approximately $1,000, and the carpenter labor to about $2,000.

The building, known as the Dresden Apartments, is located at 125 Daisy Street, Long Beach, Cal., and was designed by Albert L. Reed, architect, 107 West Seventh Street, Long Beach, who was also the general contractor and builder. Mr. Reed has specialized for several years in apartment houses and flat buildings.

Suggestions for Outside Painting

Comments by an Expert Written Expressly for Young Painters and Apprentices—Painting Hard Pine and Cypress

By R. H. Forgrave*

WHEN Northern soft pine and poplar were in general use for siding and finishing the outside of houses, almost any kind of paint, provided it contained a sufficient amount of oil, would hold and give good results, failing in few instances. Indeed, I have seen paint stick to the boards so long that so much of the oil had left it that water would soak through it into the boards when it rained, leaving it wet like the surface of unpainted lumber until the sun and wind had dried it, yet the pigment still continued to hang on. In these days of hard pine and cypress it is a question of material more than of anything else.

Getting paint to stand on hard or pitch pines, as it is known in some localities, is a most difficult job sometimes. As to cypress, it is almost as difficult. The scaling of paint on cypress is not so general as on hard pine.

Why the Paint Does Not Stick

What is the reason that paint does not stick well to these woods? Is it because the oil does not penetrate the hard places in the wood, a reason I have heard advanced? I think not. There are just as hard places in oak, ash, beech, etc., and not much trouble is experienced in painting them, if the paint is good. We know that paint adheres well to iron, steel and some other metals with no suction at all. So it must be due to something in the composition of the wood rather than to its texture. If you will examine either of these woods, recently seasoned, with a powerful microscope, you will find that their physical, cellular structure is entirely different, but much alike in the matter that fills the cells, inasmuch as the cells of both are filled, or, rather lined with a substance of a gummy nature. No doubt these gums are different in their chemical composition.

A Varied Experience

My experience in painting these woods has been that of others I have talked to—good, bad and indifferent. I have found the longer they have been seasoned,or, rather, the older the lumber, the better the paint will adhere. I have noticed when buildings, sided with either of these woods, have stood until they have become somewhat weather beaten that little trouble is experienced in making paint adhere. This is proof enough for me that buildings constructed of such lumber should be left to stand awhile, until the sun and rain remove some of the gum. The paint will then give better results. As buildings are generally painted as soon as constructed, we must make the paint suit the conditions as near as possible.

As a general purpose paint for outside work there is no paint superior to white lead and oil. In good drying weather no dryer of any kind should be used in the priming coat, and very little in the remaining coats. If one can conveniently do so, it is better to allow each coat to get perfectly dry before another is applied, and use no dryer at all in warm dry weather. White lead is a dryer itself, rather slow, but white lead paint will dry well in a short time during the hot summer months if the oil is right. Don't hurry a job of outside painting with white lead unless you are compelled to do so.

The Chalking of Paint

If white lead is not broken up well, and thoroughly mixed with the oil, the oil and lead will not be equally distributed. I think this is the reason why the paint will begin to chalk on one part of the job before it does on another and before the time it should begin to do so. There is not enough of oil to bind the pigment properly. We are not bothered much with chalking in this part of the country (Ohio). We have a case once in a while which I think is due to faulty mixing more than to anything else.

To break up and mix a considerable quantity of lead and oil properly with a paddle by hand is a tiresome operation. The best way to do it is to take two suitable vessels, a larger and smaller one. Put a hundred pounds or less of lead, ground in oil, in the smaller one, add a little oil, a half gallon, for instance, and thoroughly work it into the lead. Keep on adding a little oil in this manner, working thoroughly into the lead until the mass is of such a consistency that the paddle will move freely through it. Pour into the larger vessel and proceed in like manner until there is enough to do the job, or, at least one coat. Stir this mass thoroughly until you are sure the oil and lead have been equally distributed. Don't be afraid of stirring it too much. I advise mixing enough for the job and stirring frequently while the work is going on.

Proportions of Oil to Lead

This first mixing should contain three or four gallons of added oil to a hundred pounds of lead in oil. Take out enough for the priming coat and temper with oil, stirring it thoroughly; don't just stir it into the top, letting the bottom portion remain heavy. Let the paddle go to the bottom and stir until you are sure the whole is of the same consistency throughout. As some lead will stand more oil than others, I cannot tell you the exact amount of oil to use. In general, however, six to eight

*In a recent issue of the *Painters' Magazine.*

gallons of oil to a hundred pounds of lead will do the work properly. Some practical men use the priming coat so thin, if white, that the pigment is barely perceptible. I do not think this is proper. There should be enough pigment in the priming to serve as a filler to some extent. There must be the proper amount of each in the mixture in order to fortify each other. I have always had the best success when I used about 12½ pounds of lead to a gallon of oil for priming new work.

As I said in the beginning, these two classes of lumber demand a different treatment. Owing to the gum in them, no doubt, it seems that a paint containing turpentine has a better grip on the pores of the wood than a pure oil paint. I discovered this when painting bulletins. A great many bulletin boards are constructed of the cheap grades of both of these kinds of lumber, many of the pine boards containing a large quantity of pitch. Every sign painter knows, when cutting in letters, the quickest and best way to do it is on a flat ground. At first we painted them in the usual way, killing the knots with shellac and priming with lead and oil, making the last coat nearly flat. On short-time display signs we simply gave the boards one stout coat of flat paint, working it on in such a manner so as to make it cover. I discovered that work done in this manner often stood better than what we called good work. We often relettered these signs, painting over without burning off. They have stood better than those primed with oil paint, which we painted and relettered in the same way.

To make a primer for this lumber, either kind, mix the lead and oil rather stout and temper with turpentine, as is done in inside painting when a semi-flat finish is desired. It may be finished in gloss, a gloss coat being the best on a flat coat.

As to mixed paint, we have little to say, as the directions for use are furnished by the makers. However, you should be sure that it is of the same consistency throughout. To paint the lumber we speak of, open the package and allow the benzine to evaporate and thin with turpentine. All mixed outside paint contains benzine; I do not know if benzine does paint any harm, but it does it no good. It only serves as a thinner and soon evaporates.

In all cases, whether the prime coat be stout or thin, it should be rubbed well into the pores of the wood. The second and third coats should be spread on evenly so as not to have the coats thick in some places and thin in others.

Suggestions for Wall Decoration

Many of our readers are doubtless interested almost as much in the interior decoration of modern homes as they are in the constructive features, and we therefore present for their consideration a picture of a dining-room in an apartment building which has just been finished in the city of Chicago. The panel arrangement is unusually effective and affords possible suggestions that may be of value to builders and house owners generally. The picture which is here reproduced is made from a photograph kindly loaned us by the *Carter Times*, and from it we also take the accompanying descriptive particulars.



Suggestions for Wall Decoration—Scheme Adopted in a Chicago Apartment House

The cornice, picture mould, chair rail, panel moulds and all other wood trim was placed first. Then a fine canvas or sheeting was put on between all moulds and trim except in the panels where an exceptionally pretty wall paper, a large leaf pattern in old blue, grays and tan, was used. The canvassed portions were sized, lead coated and finished with white egg-shell enamel along with the wood trim.

The wood trim is birch. Portions not enameled, doors, buffet and quarter-round, were oil stained to a brown mahogany color, shellaced and rubbed with pumice and oil to a dull surface.

The doors are not of the usual panel and stile

type but are perfectly flat, having an inlay of white wood with a black wood inlaid narrow border on each side.

A prettier or more cheerful room would be hard to find and it has manifest advantages over dark walls and woodwork for average apartment dining-rooms, which are notoriously dark and gloomy.

White enamel finish for wood trim and canvas covered walls has become popular indeed of late in the cities. The demand for such work is so great that the larger contractors keep a few especially competent men with fine brushes busy all the time doing nothing but enameling.

Bungalow Operations in Washington

The bungalow type of dwelling is rapidly growing in popularity in Washington, D. C., and in the northeast section of the city there are two squares being built up chiefly with this type of home. It is said the completed operation will number close to 150 homes of bungalows and related types.

The bungalows in this section have from five to eight rooms, open fireplaces, hot-water heat, and the larger ones have two baths. A near-by section contains bungalows set back from the street so as to afford an 18-ft. lawn, the idea in most of the operations being to give comparatively large grounds. Some of the more pretentious houses contain a built-in refrigerator, icing either from the inside or outside.

Not all the dwellings are of frame construction, for at Sixteenth and Irving Streets a bungalow operation has just been completed in which the materials are hollow tile, with a brick front displaying a rug effect in tapestry brick.

Preparing for the Trades at Carnegie Institute

The Nineteen Hundred and Sixteen commencement marked the close of the first decade of the School of Applied Industries, Carnegie Institute of Technology, Pittsburgh, Pa. During the ten years 9772 young men were enrolled as students, 476 of whom have been awarded diplomas or certificates of graduation for completing the regular courses, and have entered twenty-one different industries.

The School of Applied Industries is not a trade school, except in the sense that instruction is offered in twenty-one different trades. The graduate, after completing his three years of training in the day school, does not enter industrial life as a drafts man, a carpenter, a sheet metal worker or a plumber, as is commonly supposed. His training has been of a broader nature, not confining itself to a specialized operation in a single trade nor to the whole of a single trade. It is more concerned with the trades as groups.

A young man interested in building operations will choose the course in building construction, including practical instruction in architectural drawing, sheet metal, plumbing, carpentry, electric wiring, etc. A third course is open to the young man whose interests are in the direction of equipping and installing and taking care of the equipment of a power plant or of a large building. It consists of the various branches taught under building construction, with special emphasis upon power machinery operation, sanitary equipment and installation, heating and ventilating and electricity.

For a more mature man who, on account of his previous experience in the industries, can profitably take a single trade in which he desires to perfect himself, a one-year intensive trade course is offered. No student who has been inexperienced in the trades is permitted to take this work.

The shop work in all the three-year industrial courses covers but one-half of the instruction. The other half is given over to academic work, which gives the worker the reason for the various operations in the practical training.

The combination of the theoretical and the practical, so closely allied, tends to produce the thinker in the industry instead of the automaton, or rule-of-thumb worker. The broad scope of the training in any particular course makes it possible for the graduate to start his outside work with an unusual amount of intelligence for a worker in the industry. The logical next step for him is a position of leadership as a foreman, superintendent or manager.

In addition to the day courses, the Night School of Applied Industries is a powerful factor in training workers, especially for the local industries. This is in the nature of a continuous school where the young man works at his trade during the day and comes to school for three nights a week, two hours each night. With the use of the school shop equipment, and under the instruction of expert workmen, as well as instructors in mathematics, English, chemistry, physics and drawing, a rare opportunity is afforded him to become a more efficient workman. Among the night courses are plumbing, heating and ventilating, plan reading, steam engineering, sheet metal and cornice work, electric wiring, patternmaking, foundry, forging and machine shop.

Meerschaum as a Building Material

Even the most aesthetically inclined of our American millionaires would hardly consider the luxury of living in a palace built of meerschaum as within the range of their fortunes, yet there are many unpretentious houses of this material in the Spanish town of Vallecas, near Madrid, where a coarse variety of this substance is to be found.

Getting Out Stock Window and Door Frames

Often those planing mills and lumber companies which buy window and door frames in large lots encounter the problem of not being able to get all the different kinds or styles of frames they need in their business, says S. Irvin Baer, in a recent issue of the *Woodworker*. I have been up against this same problem, and have solved it in the following way:

The sketches, Figs. 1 and 2, show window and door frames that can be used for different walls, but the door frames cannot be used for heavy brick walls. The window frames can be used for sheathing and lap siding, cove siding, lap siding only,

cove siding with 1⅛-in. casings and the cove siding cut between the casings, brick veneer walls and brick walls. Fig. 2 shows 1⅛-in. casings, a wide cap on head, and sill relished only 4½ in. The reason for this wide cap is so it may be used for cove siding and set back of same. The 4½-in. relish is, if only 4½-in. jamb is used, as for lap siding without sheathing and casings, set on studs and lap siding cut between casings. If ⅞-in. casings are wanted, such as cove siding to set outside of cove siding, they can be surfaced down from 1⅛ to ⅞ in. If brick veneer frames are wanted, all that is necessary is to put a brick mold on casings; and for box frames for brick wall it is only necessary to put brick mold on casing, build a box on, and pull the sill out so it will project a little over brick mold; this may be easily done by rebating the shoulder back farther.

In our mill we have found this to be a help, not only in getting orders out faster, but in making the frames, as we can buy them by the carload, and only have to buy one kind; it would make a lot of trouble to carry frames for the different styles. It takes only a few minutes to make such a frame to suit the order, and in buying them by the carload very attractive prices can always be had. While these frames cannot be used for all classes of work, they will come in very handy for the ordinary house, and will prove themselves a great saving. A careful study of sketches will show how we worked out this problem.

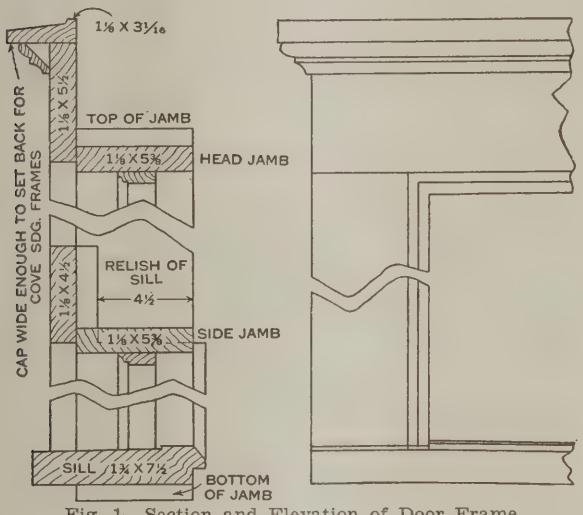


Fig. 1—Section and Elevation of Door Frame

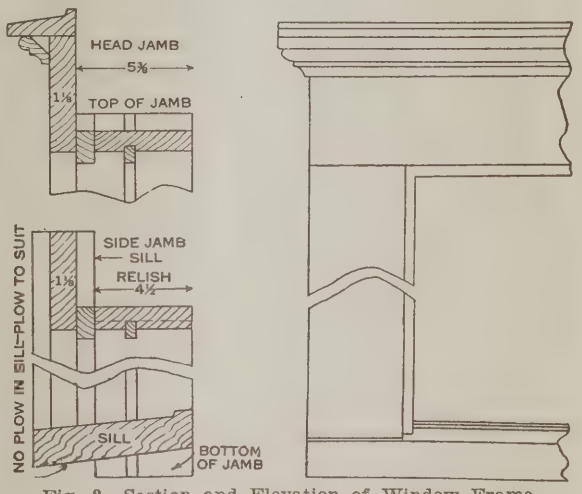


Fig. 2—Section and Elevation of Window Frame

Getting Out Stock Window and Door Frames

Course in Concrete for Manual Training Teachers

An increasing number of manual training and vocational schools are placing concrete construction in their curriculum, for its growing popularity and importance are such as to commend it to the student. With a view to aiding teachers in their work, the Portland Cement Association held a week's course in concrete construction during the latter part of June at Lewis Institute, Chicago, under the auspices of the Extension Division of the Association. The course attracted nearly 200 teachers, both men and women, and the success was such as to encourage the hope that it will be made a regular annual summer event.

The lectures and classes were conducted by the experts of the association and others prominent in the cement world. The course included discussions and demonstrations regarding materials which enter into concrete, tools and equipment, principles of reinforcing, ornamental surface finishes, plaster and glue mold work, etc. Demonstrations of the latter were carried on by instructors and students of the Mooseheart Institution in one of the laboratories, while demonstrations of slab and floor work, column work, etc., were conducted outside the building. Other lectures and classes were held in the classrooms and auditorium.

Permanent Exhibit of Woods and Stains

A permanent display of all the building woods in America is to be installed at Chicago, Ill., in the Insurance Exchange Building, where the lumber manufacturers of America are planning to provide an exhibit that will give any builder an idea of what can be done in the house he is contemplating. All sorts of finishes and various types of construction will be on display.

There will be cases containing hundreds of panels of woods, in the natural finish, and in stains. There will also be, for building engineers, an exhibit of treated and untreated woods, good and bad structural material, giving concrete examples of what kinds of wood to select for various building purposes. One of the displays will be a large model of a building of "mill construction," showing floors, roof timbers, pillars, and all the interior work on a factory building of large size.

There will be several models of farm buildings, and also of four frame houses to cost from $2,000 to $8,000 each, preferably for houses in the city. Sidewalks, creosoted block roads, models of garages and chicken houses will also be provided. One exhibit will be of large-sized specimens of structural material and other such phases of the industry. Eventually, it is planned to install such an exhibit on a modified scale in every large city in the country, to provide information for prospective builders.

Construction of Roofs in Scotland

The General Method of Procedure in Scotland—Some Interesting Details of the Work

By John Y. Dunlop

In taking up the matter of the construction of roofs in Scotland I have deemed it advisable to show a method which has been long in use in different parts of the country. The system might not suit every purpose and would be entirely out of place in connection with very small roofs, but for the general run of work of the carpenter-contractor, and more especially those who execute large contracts, the method shown is worth consideration.

Things with Which the Carpenter Is Supplied

When a building is erected in Scotland the carpenter in most cases is supplied with a roof plan and a detail of the spar at the junction of the wall such as shown in Fig. 3. He is also given the detail specifications in which the size of the roof timbers is noted and the nature of the labor at the joint.

From these he is able to lay down full size a section of the roof so that a template can be made of the different roof timbers. From the plan, Fig. 1, he is also able to obtain the length of the valley rafter or flank plate should he adopt that method.

In erecting the roof shown in Fig. 1 most of the carpenters here in Scotland would allow the main roof, which extends from gable to gable, to run right through, then have it boarded on five sides leaving a small portion blank where the wing roof would meet the main roof. The wing roof would then be set up and the flank plate, which is a piece of 1 x 9-in. timber, laid flat on the roof boarding so that the outer edge is contained by the plane which is formed by the upper edge of the roof spars, nailed in position. The jack rafters are then cut to fit on the flank and ridge, as shown in Fig. 5.

The advantage of this method, which is fully appreciated in Scotland, is that it does away with the long and heavy flank rafter, saves the cutting of a great number of jack rafters, and as most of this work is paid for by the square yard of sloping surface it pays the contractor much better to adopt the flank plate system.

One Method of Framing the Roof

Another method which Scotch contractors sometimes adopt is to cut the whole of the roof timbers with a circular saw in the yard, or with a portable saw on the job. This is another great saving, provided of course there is no trouble in erecting.

In a case such as this, say with a roof similar to that shown in Fig. 2, the roof plan would be used to obtain the dimensions of the spars, and the hip and valley rafters. The roof would then be set up in sections full size and the templates made for the common spars.

In erecting, the common spars would be set up, then the position of the flank rafters and the hip rafters determined, all as shown in Fig. 6. The position of the jack rafters on the valley and hip rafters would now be marked off and the length of each taken and marked on a board.

Fig. 7 represents a dimension board for this roof with the three bevels which would be required in the cutting of the jack rafters. The plumb bevel for the top end, the level bevel for the bottom and the side bevel for the edge of the top end are shown. The measurements of the jack rafters for one end of the roof are also shown in Fig. 7. This measurement board when complete is sent along to the mechanic to have the material prepared.

Setting Up the Framing Timbers

In setting up the different lengths of the spars they should be drawn in pairs, as this prevents mistakes, such as cutting too many for one side. Fig. 8 shows one pair set on the bevel drawn ready to be cut.

The timber is now taken along to the saw and cut by allowing it to rest on one arise, then tilting slightly back so as to bring the setting-out line in a true plane with the revolving saw, as in Fig. 9.

In some cases the spars are required to be marked for the part of the roof for which they have been cut, but this is a small matter compared with the setting out and cutting of a heavy roof, as very often it has to be done on insecure footing and at a giddy height.

Mammoth Loft Building

It has been decided to increase the height of the four-story post office and express building covering the block between Lexington Avenue, Forty-fifth and Forty-sixth Streets, New York City, to twenty stories, and plans for the work have recently been filed. The plans provide for the extension of the building over the street at the rear of the Grand Central Palace to Park Avenue, and all the new stories are intended to be occupied as lofts.

The completed building will cover an area of 200.10 x 405 ft., or about 81,400 sq. ft. to a floor, thus making a total for the sixteen new stories of 1,302,400 sq. ft.

Annex to the Hotel McAlpin

The proposed annex to the Hotel McAlpin, West Thirty-fourth Street and Broadway, New York, will make that structure what is said to be the third largest hotel in the world. The addition is to be twenty-three stories in height and will contain 200

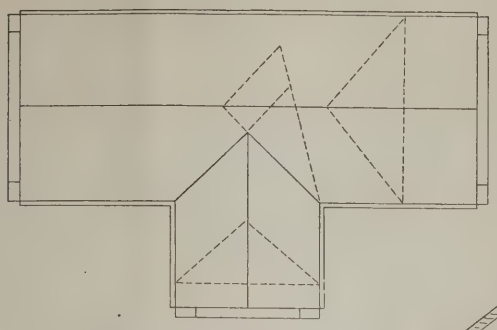


Fig. 1—Plan of Roof Shown in Fig. 5

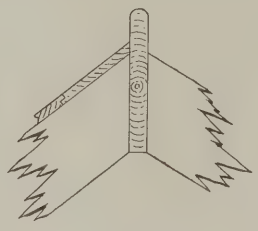


Fig. 4—Detail at the Ridge

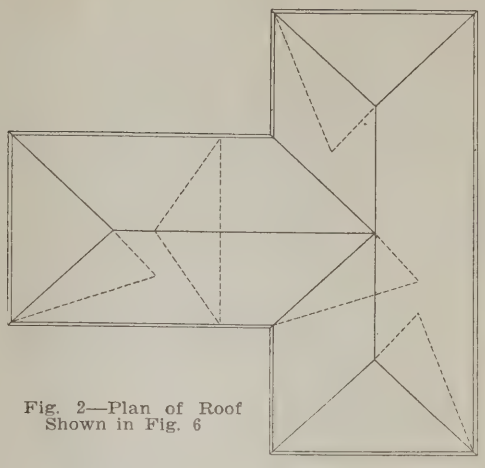


Fig. 2—Plan of Roof Shown in Fig. 6

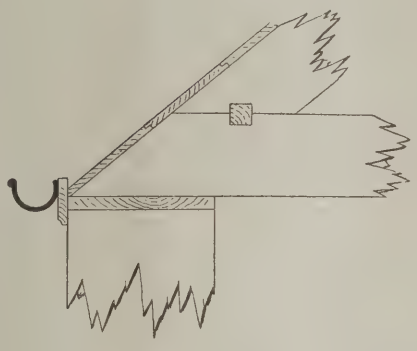


Fig. 3—Joint at Foot of Rafter

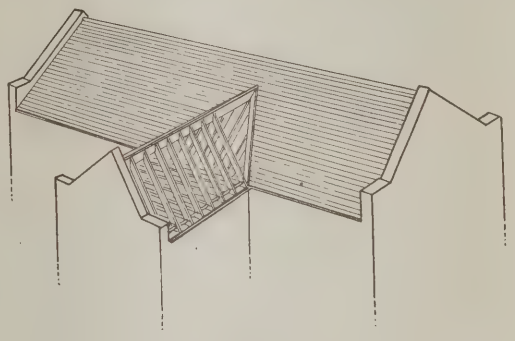


Fig. 5—Showing Construction of Roof Indicated in the Plan, Fig. 1

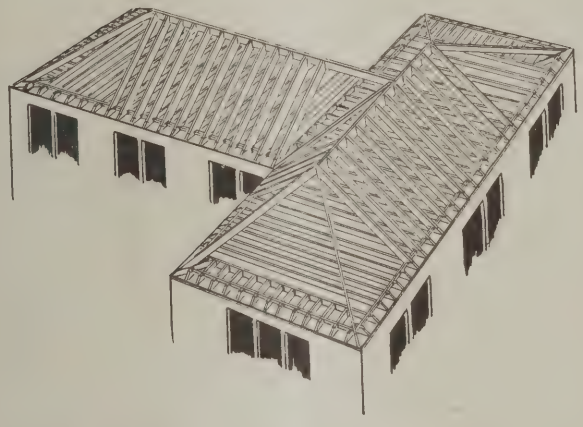


Fig. 6—Showing the Drawing of the Roof, Fig. 2



Fig. 8—A Pair of Spars Set on the Bevel Drawn and Ready to be Cut

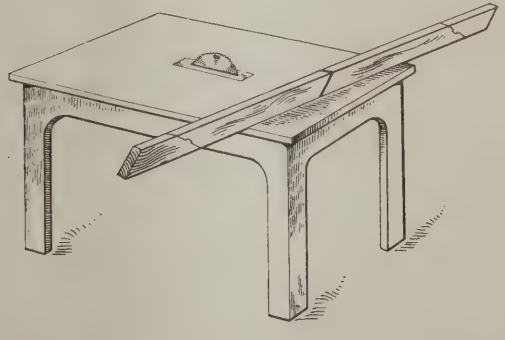


Fig. 9—The Position of the Timber on the Saw Table

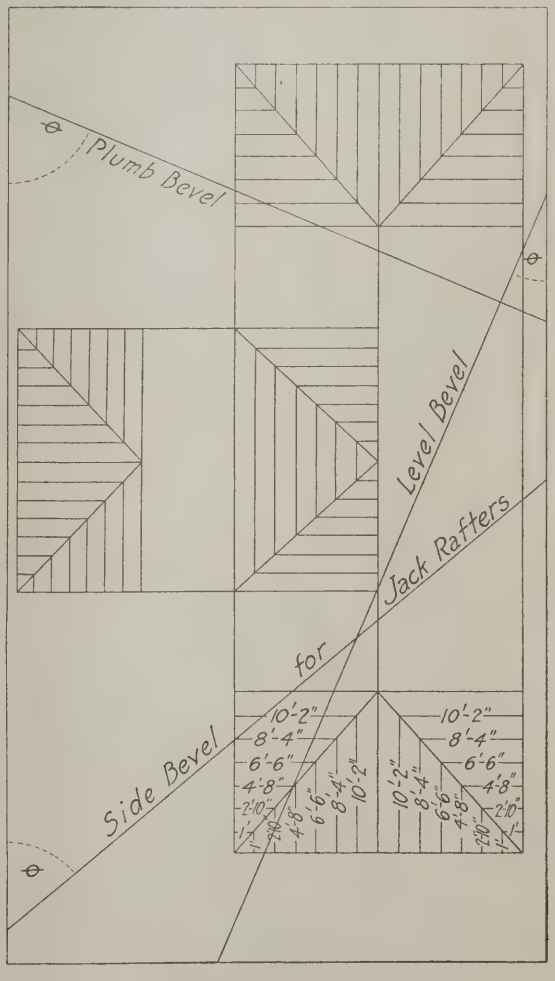


Fig. 7—A Dimension Board

Construction of Roofs in Scotland—Various Interesting Details

rooms, making a total, with the main structure, of 1700 rooms. A feature of the annex will be the large amount of space devoted especially to women, a large ballroom, a children's playground, and, on the roof, an outdoor playground.

The annex is estimated by the architects, Warren & Wetmore, to cost $1,000,000. Construction work is being done by the Thompson-Starrett Co.

Kinds of Lumber Cut in 1915

The lumber cut of 1915, by principal kinds, has just been compiled by the Forest Service, with results shown in detail in the table below. Southern yellow pine, with a total cut of 14,700,000,000 board feet, forms 30 per cent of the total, and was more than three times the cut of Douglas fir, the second on the list. Oak, white pine and hemlock are the only other kinds showing over 2,000,000,000 ft.

1915 Lumber Cut by Species

Kind of Wood	Probable Total, M Ft.	Reported M Ft.
Yellow pine	14,700,000	12,177,335
Douglas fir	4,431,249	4,121,897
Oak	2,970,000	2,070,444
White pine	2,700,000	2,291,480
Hemlock	2,275,000	2,026,460
Spruce	1,400,000	1,193,985
Western yellow pine	1,293,985	1,252,244
Cypress	1,100,000	926,758
Maple	900,000	771,223
Red gum	655,000	478,099
Chestnut	490,000	399,473
Yellow poplar	464,000	377,386
Redwood	420,294	418,824
Cedar	420,000	352,482
Birch	415,000	355,328
Larch	375,000	348,428
Beech	360,000	303,835
Basswood	260,000	207,607
Elm	210,000	177,748
Ash	190,000	159,910
Cottonwood	180,000	138,282
Tupelo	170,000	153,001
White fir	125,048	121,653
Sugar pine	117,701	115,109
Balsam fir	100,000	71,358
Hickory	100,000	86,015
Walnut	90,000	65,144
Lodgepole pine	26,486	22,672
Sycamore	25,000	19,729
All other kinds	49,531	37,826
Total	37,013,294	31,241,734

The figures include both the actual reported cut from the mills making returns and the estimated probable actual cut. The total cut of all species is shown as 37,013,294,000 ft., as has been previously announced by the Forest Service. It is believed that at the outside the grand total 1915 lumber cut did not exceed 38,000,000,000 ft.

The actual reported cut of lath in 1915 was 2,745,134,000 and the estimated total cut 3,250,000,000. For shingles, the reported cut was 8,459,378,000 and the estimated total cut 9,500,000,000.

Because of the closer touch of the Western offices of the Forest Service with the mills in their territory, and the consequent greater accuracy of the estimates of probable total cut of the Western species, the figures for these species are not rounded off as are the corresponding figures for other kinds. The many thousand mills east of the Rocky Mountains make estimates of more than approximate accuracy impossible.

Local Building Operations in July

The amount of new construction work for which permits were issued in July by the Bureau of Buildings in each of the five boroughs of Greater New York makes a highly gratifying exhibit when compared with the figures for the same month last year. The total is $50,526,144, as against $12,246,489 a year ago, the cost of alterations to buildings being omitted in both instances. Of this enormous total for July, 1916, the Borough of Manhattan furnished $45,472,250, which is the estimated cost of the 101 new structures for which permits were issued by Superintendent Alfred Ludwig of the Bureau of Buildings. Counting in the cost of alterations to 404 buildings of $3,732,970 gives a total for the Borough of $49,205,220. These figures contrast with 50 new buildings for which permits were issued in July, 1915, estimated to cost $4,097,080, and alterations to 268 buildings estimated to cost $748,223, or a total of $4,845,303.

This tremendous increase in Manhattan over last year was due almost wholly to the rush of builders to anticipate the new measure which is designed to not only place a restriction on tall buildings but to check the invasion of retail districts by factories and business streets. This measure was unanimously adopted by the Board of Estimate on July 25 and during the two or three days prior to its adoption plans were filed for operations involving an estimated outlay of more than $20,000,000.

According to classification plans were filed in Manhattan for 23 apartment houses, to cost $11,665,000, against 19 in July last year, to cost $1,585,000. Of hotels 11 were planned last month to cost $9,930,000 against one a year ago costing $60,000. There were 18 store and loft buildings planned last month to cost $11,955,150 against 8 a year ago, to cost $1,444,000. Of office buildings 14 were planned last month, to cost $7,581,000, against none a year ago; 10 manufacturies and workshops, estimated to cost $2,670,000, against 2 last year, to cost $3,000; 2 places of amusement, to cost $160,000, against one last year, costing $40,000, and 11 garages, to cost $528,000, against 12 in July last year, to cost $122,080.

It will be seen from these figures that of the $45,472,250 which is the estimated cost of the new construction work planned last month, four classes of buildings account for $41,131,150 of the total.

Registration of Architects

The law which recently went into effect in New York State regarding the licensing of architects is rather more exacting than that in some of the other states. For example, it provides that nobody must practise under the title of "architect" unless he has received a certificate of qualification from a board of five examiners. In New Jersey, however, a diploma or other evidence of graduation from a full course of architecture may be accepted as a satisfactory evidence of competent knowledge of architecture, design and construction. In New York this must be supplemented by at least three years' practical experience.

In New Jersey, again, any person who was engaged in the practice of architecture when the act

was passed, and presents an affidavit to that effect, is entitled to receive a certificate without further test. In New York the act provides that an architect must have been engaged in the profession for more than two years before the passage of the act, and must also present satisfactory evidence as to character, competency and qualifications before he is entitled to a certificate.

Moving a House with an Automobile

Many and varied are the uses to which automobiles have been put since they became so popular with the public, and the wide-awake contractor and builder is ever on the look-out for new "stunts" which may be performed in connection with a machine of this nature. The accompanying picture shows the unique manner in which an automobile was utilized to help a house mover out of the predicament in which he found himself.



Moving a Two-Story and a Half Frame House by Means of an Automobile

A two and a half story frame house was being moved in Tulsa, Okla., and the horses attached to the cable were having a hard time of it in pulling the weighty building. Just then the sales manager of the Carhart Motor Company happened to be passing the scene of operations in an Overland "Six" and noting the predicament of the horses had his machine hitched to the cable and its 45-hp. motor soon started the building on its journey, while the horses, not to mention the men, seemed to view the proceedings with an expression of great relief.

Birch for Interior Finish

It is a well-known fact that birch is one of the most widely useful of woods, a recent tabulation of factory reports showing that it is used for nearly 200 distinct purposes. More than half the total output, said R. S. Kellogg in an address before the National Association of Owners and Managers of Buildings at one of its more recent meetings, is used for mill work which includes all kinds of interior finish, high-grade flooring, veneered doors, etc., and in the manufacture of furniture and fixtures. In fact, it is in the field of interior finish that birch finds its most appropriate use.

There are as many styles of birch trim as there are designers who wish to produce an unusual or particularly appropriate effect. The author expressed a preference for the simpler styles which offer the fewest possible angles and corners to collect dust, and at the same time give the largest uninterrupted surface to display the figure and sheen of the wood itself. For the same reason his choice is for the softer hued stains which bring out the qualities of the wood in harmonious fashion, rather than for more brilliant colors or paints which obscure the natural beauty of the wood.

Great progress has in recent years been made in the manufacture of artistic veneered doors, of which many styles are available. One of the most pleasing is a single panel birch door stained silver gray, but other styles have many admirers.

The demand for conveniences and economy of space has resulted in a wide variety of built-in work, all the way from kitchen to bedroom. Built-in bookcases, china closets, sideboards and wardrobes are considered among the necessities of the modern residence. For them no wood is superior to birch. In addition to its desirable qualities of figure and color, birch looks well and fulfills every requirement of high-grade cabinet wood. We have all seen beautiful examples of built-in work that harmonizes perfectly with finish and furniture, which are also the ultimate of convenience and utility.

As to where we shall use birch, I would say everywhere in the interior of your building. It is of proved worth for such hard service as store counters, showcases and fixtures, while its merits

make it just as appropriate for trim of the finest residences, apartments, offices and hotels. Moreover, the reasonable cost of birch places it easily within the reach of the builder of the modest cottage or bungalow. The Colonial hall and stairway in white enamel, the living-room in silver gray, the dining-room in one of the many shades of brown, the bedroom in white enamel or natural, the den to suit the owner's particular fancy—all offer suitable opportunities for the use of birch.

Among the stains which I like best on birch are silver gray, walnut, fumed oak, natural and Mission brown. These are colors which harmonize well with general schemes of decoration, and are not likely to get on anybody's nerves. However, I have no quarrel with the user of birch who prefers an entirely different selection. The wood will take and hold permanently any stain of the right kind that is properly applied. An authority says that "Birch is the ideal high light for a scheme of coloring in browns with notes of blue and orange"; also that silver gray is beautiful in a room with walls of dull old blue, and a ceiling of silver gray on which are frescoed pink old roses, but not being a professional decorator, I shall have to go carefully here.

One of the best features of birch is that it combines so well with other woods. I have seen excellent combinations of maple or oak floor with birch trim, and of birch veneered doors with a trim of other woods or white enamel. Your own observation will furnish a multitude of instances of this sort. It is evidence enough of the qualities of birch and its popularity with architects to say that it is used in leading hotels, apartment houses, office and banking buildings, and in uncounted residences throughout the country.

Outing of Ohio Builders' Supply Men

The summer outing of the Ohio Builders' Supply Association was held at Cedar Point, July 27, 28 and 29. About 150 members were present and are said to have thoroughly enjoyed themselves.

During the outing President W. O. Holst called to order a short executive session at which it was decided to hold an evening meeting for the purpose of listening to H. S. Gaines, the official organizer of the National Builders' Supply Association, who made an interesting and suggestive speech about the possibilities of increasing the membership by means of the district organization plan. He made such an impression that the idea is to be taken up at an early date.

An exhibition of the work of the pupils of the Baron de Hirsch Trade School, 222 East 64th Street, New York City, was given on Thursday evening, July 13, from seven until ten o'clock. The display attracted much interest on the part of visitors, showing as it did a most creditable degree of proficiency by the pupils.

Lincoln, Neb., is said to be enjoying the greatest building boom in its history.

New Publications

Electric Wiring Diagrams and Switchboards. By Newton Harrison, E. E., with additions by Thomas Poppe. 272 pages, size 5 x 7½ in. Illustrated by 129 diagrams. Bound in flexible cloth. Published by the Norman W. Henley Publishing Co. Price, $1.50.

Electricity as a means of illumination for dwellings and public buildings is rapidly gaining in popularity, and new structures erected in sections where the current can be secured from a public main are wired for the purpose. The book under review, now in its second edition, is stated to be "A practical, comprehensive treatise explaining the theory and design of wiring circuits," and a "guide for all interested in the application of electricity to illumination and power." As such, it contains much valuable material presented in a fashion to afford the reader a good knowledge of the subject. Those who have no knowledge of higher mathematics will find the work within their understanding, for all calculations and examples are limited to the use of arithmetic, both in the case of direct and alternating current.

The work treats of the fundamental principles of electricity, wiring systems and functions of mains, feeders, etc.; resistance, types and connections of motors; switchboards, their parts and purposes; generators for alternating and direct current lighting, and many other things of an interesting and instructive nature.

Gothic Ornaments. By A. Pugin. 92 full-page plates, size 11½ x 9 in. Bound in cloth. Published by J. Tiranti & Co. Price, $5.00.

The Gothic period saw the erection of some of the most sublime and beautiful structures known to architecture. Gothic influence and tradition are still living and vital forces of to-day, and therefore many architects make a special study of this phase of their work. Of interest and value to such is the book under review, for it is a new edition of a work originally printed in 1831 and reproduced in 1854 which had for its purpose the reproduction of Gothic ornaments selected from various ancient buildings erected during the period from the eleventh to the sixteenth century in England and France.

Wood carvers everywhere refer to it for really sound detail of the best practical examples of various kinds of Gothic work, and it is described as "one of those Technical Art Books which never get out of date." The few matters which have been revised have been solely in the direction of facilitating reference and greater handiness. The illustrations, which are reproductions of charcoal drawings, are of sufficient size to enable an architect to easily catch the details. Some of the subjects treated are arms, bosses, canopies, dogtooth ornament, elbows, finials, grotesques, panels, tracery, spandrils, weepers, etc. The present edition is said to be limited to 500 copies.

A pamphlet, describing with great clearness and force the need of a state regulation of plumbing, house drainage and ventilation, is being distributed through Texas under the auspices of the Texas Association of Journeymen Plumbers.

Brief Review of the Building Situation

Building Operations for July in 119 Cities Show an Increase of 72.48 Per Cent Over July, 1915

THE outstanding feature of the building situation as it is reflected by the reports of operations for which permits were filed in July, is the very unusual increase of 72.48 per cent for 119 cities, as compared with the activity in new construction work in July a year ago. This is particularly noticeable in the eastern section of the country, where the gain in the cities reporting is nearly 134 per cent. An analysis of the figures, however, shows that this very gratifying exhibit is largely due to the rush to file plans of imposing structures in the Borough of Manhattan, New York, before the measure restricting the heights of buildings and preventing the erection of factories in the retail districts was adopted. Eliminating New York City from the calculation shows the gain for the 119 cities reporting to be only 7 per cent. The number of permits issued during the month shows an actual decrease as compared with July, 1915.

From the Eastern section of the country we present reports from 47 cities, of which 16 indicate increases and 31 decreases, as compared with last year, or a total gain of 133.84 per cent. Eliminating the figures for the Borough of Manhattan, New York, for reasons stated above, and the showing is a loss of 8.7 per cent. A comprehensive idea of the activity during the two periods in the Eastern cities reporting may be gathered from an inspection of the table which follows:

CITIES OF EASTERN STATES

	July, 1916	July, 1915
Albany	153,325	416,760
Allentown	62,280	79,075
Altoona	71,221	85,031
Atlanta	200,717	613,146
Auburn	39,570	43,401
Belleville	29,305	21,040
Binghamton	144,831	146,599
Boston	4,912,000	5,483,000
Bridgeport	464,157	1,061,200
Brockton	104,612	84,517
Buffalo	1,135,000	1,494,000
East Orange	225,859	144,848
Elizabeth	121,305	118,382
Erie	255,781	283,700
Harrisburg	90,215	144,325
Hartford	363,756	441,767
Haverhill	101,950	145,000
Hoboken	109,790	48,078
Holyoke	97,400	178,915
Lawrence	68,650	56,375
Manchester	87,511	309,050
Newark	577,345	581,133
New Bedford	269,425	320,720
New Britain	169,870	64,780
New Haven	266,175	788,454
New York:		
Manhattan	49,205,220	4,845,503
Bronx	1,283,266	1,963,993
Brooklyn	2,522,105	4,196,609
Queens	1,482,006	2,546,266
Richmond	555,770	192,252
Passaic	122,917	74,750
Paterson	206,831	146,775
Philadelphia	3,101,385	3,659,940
Pittsburgh	966,296	1,186,632
Quincy	267,330	490,520
Reading	164,075	82,700
Rochester	1,078,864	762,123
Scranton	171,706	311,370
Schenectady	392,249	239,148
Springfield	427,295	436,755
Trenton	114,985	385,521
Troy	62,373	125,161
Utica	157,900	112,205
West Haven	50,315	335,725
Wilkes-Barre	185,580	45,133
Worcester	526,545	703,329
Yonkers	291,200	346,700

In the Central West, or Middle States, the 37 cities reporting indicate an increased activity in the projection of new construction work of 26.22 per cent as compared with July a year ago. The noticeable centers of activity are Chicago, Detroit, Milwaukee, Minneapolis, St. Louis and Youngstown, while Akron, Cincinnati, Dayton, Evansville, Kansas City and South Bend are some of the more noticeable showing a falling off in activity.

CITIES IN MIDDLE STATES

	July, 1916	July, 1915
Akron	756,425	1,148,750
Cedar Rapids	146,000	167,000
Canton	341,440	247,450
Chicago	8,076,800	6,455,630
Cincinnati	768,350	1,275,100
Cleveland	3,397,660	2,319,280
Columbus	563,085	504,085
Davenport	123,060	46,355
Dayton	350,805	232,105
Des Moines	138,383	181,405
Detroit	4,622,590	2,663,080
Dubuque	84,800	23,100
Duluth	172,240	201,422
East St. Louis	51,450	142,976
Evansville	242,781	396,770
Fort Wayne	289,500	202,580
Grand Rapids	246,822	211,639
Indianapolis	818,979	598,078
Kansas City, Mo.	1,108,140	1,418,060
Kansas City, Kan.	51,940	77,177
Lincoln	157,275	272,335
Milwaukee	2,067,794	844,967
Minneapolis	1,913,175	1,474,265
Omaha	584,675	556,780
Peoria	166,435	121,190
Saginaw	63,965	54,897
St. Louis	1,541,421	615,148
St. Paul	782,224	770,018
Sioux City	299,150	218,200
South Bend	97,652	229,210
Springfield, Ill.	103,100	63,400
Superior, Wis.	71,155	52,250
Terre Haute	69,740	109,140
Toledo	565,492	534,012
Topeka	101,893	168,991
Wichita, Kan.	135,800	89,825
Youngstown	274,800	147,650

Of the four zones into which the country has been divided in reviewing the building situation, the Southern is the only one showing a loss as compared with last year. Of the 19 cities reporting from this section, 8 show gains and 11 losses, with a total loss of 11.57 per cent. The largest gain is reported by Washington.

CITIES IN SOUTHERN STATES

	July, 1916	July, 1915
Baltimore	618,218	695,375
Birmingham	141,418	223,987
Chattanooga	39,984	32,375
Dallas, Tex.	268,176	656,124
Fort Worth	257,220	220,029
Houston	196,341	164,720
Huntington	102,100	132,040
Jacksonville	214,275	187,382
Louisville	185,380	599,320
Memphis	261,405	245,285
Montgomery	40,481	40,810
New Orleans	381,126	513,510
Norfolk, Va.	103,612	163,575
Oklahoma City	183,575	81,530
Richmond	269,169	328,667
Savannah	132,095	154,840
Tampa	79,425	82,010
Tulsa	285,500	242,865
Washington	1,814,753	1,424,207

In the extreme West, taking the territory lying beyond Denver, 16 cities report a gain over July last year of 18.7 per cent. The striking increase is that reported by Seattle, due largely to the filing of plans for two large fireproof structures estimated to cost $545,000. Spokane also shows an important gain, as do Denver, Salt Lake City and Tacoma.

CITIES IN EXTREME WESTERN STATES

	July, 1916	July, 1915
Berkeley, Cal.	121,350	182,100
Colorado Springs	55,025	22,690
Denver	348,770	177,090
Los Angeles	909,056	936,873
Oakland	357,126	410,322
Pasadena	153,371	190,789
Portland	368,525	373,375
Sacramento	180,539	280,247
San Diego	120,641	71,325
Salt Lake City	192,325	174,550
San Francisco	1,497,279	1,500,206
San Jose	19,232	29,971
Seattle	1,107,160	315,010
Spokane	147,470	66,263
Stockton	44,629	46,103
Tacoma	84,936	31,161

Current News of Builders' Exchanges

Various Matters Likely to Prove of Interest to Members of Exchanges Throughout the Country

Convention of North Carolina Builders' Exchange

THE semi-annual convention of the Builders' Exchange of North Carolina was held at Wrightsville Beach on Aug. 2 and 3. Meetings of the general contractors, sub-contractors and material men who belong to the Exchange occupied the first day and the general meeting was held on the second day of the convention.

A number of interesting addresses were made, including one by Joseph Litener, ex-president of the North Carolina Architects' Association. The social features of the event were enjoyed by all.

Outing of Grand Rapids Builders' Exchange

The fourth annual outing of the Builders' and Traders' Exchange of Grand Rapids, Mich., held on July 29, was enjoyed by two hundred members and their guests, among whom were included representatives of the Plumbers' Association, the Engineering Society and various architects of the city. They were conveyed by automobiles to Crooked Lake and once arrived there showed that the building business has no bad effects on appetites, for there had been provided for them a roasted ox, five bushels of green corn, 100 berry pies and ten gallons of coffee. Some of the members complained of the heat so the committee called off the greased pig event because the grease was so hot it would not stick. The principal event of the afternoon was a ball game between teams from the building contractors and the Master Plumbers' Association, the prize of a silver loving cup being won by the plumbers. Other events were a tug-of-war, in which the material men defeated the contractors, foot races, a balloon ascension and a parachute drop by the Moore brothers.

Membership Campaign and Banquet of Flint Exchange

The membership campaign of the Builders' and Traders' Exchange of Flint, Mich., has been gratifyingly successful, for the one hundred mark has now been passed and one-half of this number is the result of the recent campaign.

On Aug. 4 the members of the Exchange entertained a delegation of the Builders' and Traders' Exchange of Detroit at a banquet given to celebrate the growth of the former body, which is now two years old. Several interesting addresses were made by officials of the Detroit Exchange, including President W. A. C. Miller, Treasurer T. E. Beck and Secretary Charles A. Bowen.

Chicago Builders' Exchange Has a "Dutch" Luncheon

Members of the Builders' and Traders' Exchange of Chicago, Ill., had a most enjoyable time in the association's club rooms in the Chamber of Commerce Building on Thursday evening, July 27, when a Dutch luncheon was served. This affair was held in lieu of a regular outing, and during the evening an entertainment program enlivened the proceedings to an appreciable extent. Refreshments and a wide variety of inviting comestibles were served to about two hundred members and friends, and a number of prospective members were present to see the enthusiasm that is an unwritten law of the exchange. The officers of the exchange were on hand to greet everyone and the affair was voted a most successful one.

The Situation in Buffalo

In writing of the situation in that city, F. N. Farrar, secretary of the Builders' Association Exchange, Buffalo, N. Y., says:

Our exchange had an automobile run Tuesday, July 18, and wound up at the Auto Club's country home for a splendid dinner. The event of this month will be a river party in the shape of a trip around Grand Island. The usual outdoor sports will be a feature, including a ball game, which, in view of the fact that the exchange has some very good players, ought to be an interesting event.

Practically every trade in the building line is asking for an advance in wages, regardless of the fact that they are already exceedingly well paid and that the average employer is trying to recover from the effects of two very lean business years. Glowing accounts of the prosperity of certain concerns who are blessed with business due to munitions and other war contracts have furnished an excuse for the unions to make demands on the ordinary building contractors, which, if acceded to, would practically put them out of business. If the men were content with an advance of wages without exacting the conditions that invariably accompany the demands for higher pay, the situation might be met, up to a reasonable limit, but it is the experience of the employers that the day's output falls off as wages advance, instead of increasing in something like the same proportion, or, at the least, being maintained at approximately a fair standard.

A movement is on foot in New London, Conn., looking to the formation of a Master Builders' Association.

Steps have recently been taken in Nashville to organize what will be known as the Tennessee Association of Builders' Exchanges, with James A. Daugherty of Nashville as president.

Want Los Angeles Contractors Licensed

The Master Builders of Los Angeles recently brought before the city council of that city a proposed ordinance, which is still under consideration, and which would require that all persons conducting a business of building and contracting shall register at the office of the inspector of buildings; the payment of a yearly license fee of $100, and the furnishing of a $5,000 bond to cover any violation of the building ordinance.

Convention of National Association of Builders' Exchanges

The next convention of the National Association of Builders' Exchanges will be held in Atlanta, Ga., on Feb. 13, 14 and 15 of the coming year.

The ninth annual convention of the National Association of Building Owners and Managers will be held at St. Louis on Sept. 12 to 15.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Concrete Mixing Plant on Roof of Skyscraper

In carrying out an important piece of work in connection with an extensive addition to a large store building in the city of Chicago it was necessary to establish a complete concrete mixing plant on the roof of the structure. The building in question is nearly a block in length, extending to an alley in the center of the square, and is ten stories above the street level and three below. The building is of modern steel frame construction erected several years ago, and was designed to carry additional stories when the growth of the business of the concern occupying it should require them. Recently it was desired to construct an additional story at the south end of the building extending 176 ft. on State Street and 144 ft. on Van Buren Street, and a contract for the work was awarded to the Clark-Bisbee Company, 175 West Jackson Boulevard, Chicago. The street walls of the present building extend a considerable distance above the roof, so that it was only necessary to erect a new roof and floor with the required columns, beams and girders. The new construction is entirely of reinforced concrete and the contractors decided that this could be handled to the best advantage by placing the mixing plant on the present roof of the building. The picture presented in Fig. 1 shows the appearance of the work while in progress.



Fig. 1—View of Roof of Skyscraper in Chicago Showing Concrete Mixing Plant

The equipment of the building included two large high-speed freight elevators running from the third basement to the tenth floor, and one of which was of 10 tons capacity. In the third basement or, as it may be termed, the third story below the street level, were several elevator hoppers connected by chutes with the surface in the rear alley and provided with discharge gates designed to provide coal storage for the furnaces and which discharge the coal into a traveling bucket when required. It was decided to use several of these hoppers for handling the sand and stone in the new construction work. The material was delivered in six-ton auto trucks and dumped down the chutes into the hoppers, from which it was gated into wheelbarrows. The large elevator carried nine wheelbarrows and the smaller one five at each load to the tenth floor. An inclined runway was built from the tenth floor to the roof and all materials used in the concrete and in the new construction work were transported from the tenth floor up this inclined runway.

For mixing the concrete the contractors made use of a motor-driven "Standard" low-charging mixer of 8 cu. ft. capacity. This mixer was selected by reason of its light weight and great portability. It was taken up on the large elevator to the tenth floor and then up the runway to the roof, 180 ft. above the street level. In this work the columns, girders, beams and roof were constructed, after which the old roof underneath was removed and replaced with a reinforced concrete floor. There were required for the work 95 concrete beams, 22 concrete girders, 14 concrete columns and in the construction work there were used more than 13 tons of reinforcing steel rods, many of them 28 ft. long; also about 40,000 ft. of lumber for the "forms." The concrete was a standard 1:2:4 mixture, the coarser aggregate being crushed limestone screened to a ½-in. mesh. Due to the excellent facilities for handling the material, the work progressed rapidly and with apparently little more difficulty in handling the concrete than when mixed at the ground level.

New Stanley Barn Door Latch

A new barn door latch embodying a number of features likely to interest the architect and builder is shown in Fig. 2 of the illustrations. It is built around the idea of durability, its few parts being heavy and strong. Its construction is such as to protect the parts against rust, the bolt being tinned, the spring

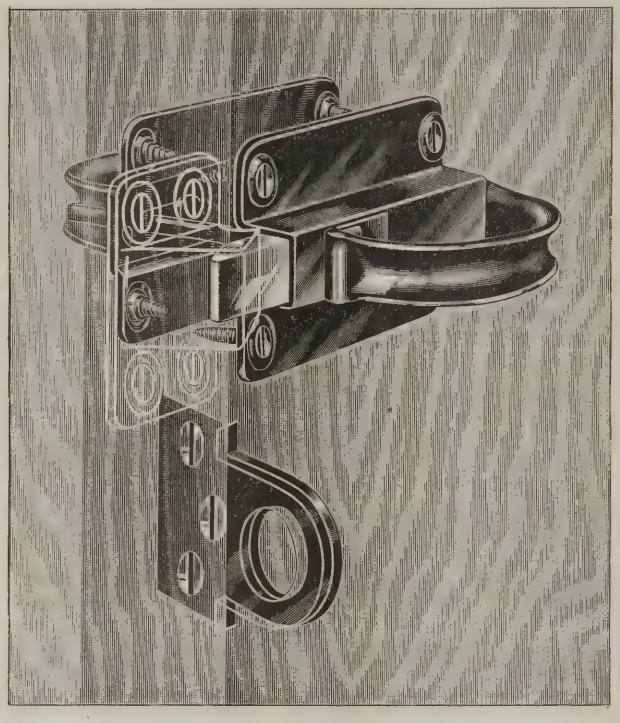


Fig. 2—The New Stanley Barn Door Latch

sherardized and the handles, plates and strikes heavily coated with japan. The latch is also furnished galvanized when so desired. The angle slant on the strike and the bevel on the bolt allow the latch to lock automatically. It is easily operated from either side of the door by means of a roomy, comfortable handle. It is adjustable for doors all the way from ¾ in. to 1¾ in. thick. The bolt is wrought steel, solid at its working point, and has a throw of 15/16 in. A pull on either handle slides the bolt back. The two handles are connected by a steel bar ¼ in. thick. An inspection of the illustration shows how the inside plate is applied well back from the jamb so that there is no danger of injuring the hand. This inside handle may be omitted if desired and the latch converted into an extra heavy catch. The strike is made wider than the bolt so as to allow for any sagging of the door. This new barn door latch has just been placed upon the market by the Watrous-Acme Mfg. Co., Des Moines, Iowa, whose sole sales agent is The Stanley Works, New Britain, Conn., and with New York office at 100 Lafayette Street. The latch is packed ¼ dozen in a carton with ⅞ in. No. 10 screws, one pair of Safety Padlock Eyes, and full directions for its proper application.

"Perfect Art" Metal Ceilings

Artistic thought and adaptability of design to material are manifested in "Perfect Art" Metal Ceilings, which is the title of Catalog No. 16, issued by the James H. Watson Co., Bradley, Ill. The company directs special attention to its new line of Gothic and Colonial designs, also the improved Re-pressed Beads and Die-cut Nail Holes. The beads and buttons of all plates are now re-pressed on Tool Steel Dies, so that every bead and button is exactly alike and fits accurately over the underlapping bead and button, thus producing a tight and perfect joint. The metal is cut out at each nailing point so that nails can be driven through the points, where the corners of the plates fit together, without extra effort. The result of these improvements is claimed to be decreased cost of erection. Halftone engravings, the majority of which are nearly full page size, illustrate the catalog and depict Ceiling and Wall Plates, Cornices, Profiles of Cornices and Mouldings, Centers and various designs of styles such as Louis XIV, Colonial, Gothic, Italian Renaissance, Romanesque, etc., together with their prices. There is also included directions for applying the ceilings over plaster or wood lath, prices and "How to Figure Quantities and Prices."

A New Dixon Pencil

Builders are sometimes confronted with a brick wall of decidedly porous material, which after a hard storm is wet enough to damage material in contact with it on the inside. The remedy applied some years ago to the First National Bank Building of Jersey City, N. J., will therefore interest many. The building is exposed to the salt air from the North River and also to all the driving storms from the East. The wall was painted with Dixon's Silica-Graphite Paint made by the Joseph Dixon Crucible Co., Jersey City, N. J., which rendered the walls impervious to moisture. Draftsmen, architects and others who use high grade drawing pencils will be interested to learn that the company has added a new pencil to its well-known line in the "Eldorado," the "master drawing pencil," furnished in 17 grades. It is claimed to have a strong, long-wearing, smooth and evenly graded lead. We understand that full-sized samples will be sent by the company when requested on the letterhead of any reader of THE BUILDING AGE and addressed to "Department 190-J." It is interesting to note in "Graphite" that two additions are being made to the plant of the company.

Universal Telescoping Casement Adjuster

A new telescoping adjuster for use on windows opening either in or out has recently been placed on the market by the Pacific Hardware Mfg. Co., Los Angeles, Cal. This adjuster is called the "Universal" and a view of it is shown in Fig. 3. It has a new tension grip operated by a thumb screw, which, it is said, can not slip out of place when once adjusted and is made of solid brass with any standard finish that may be required.

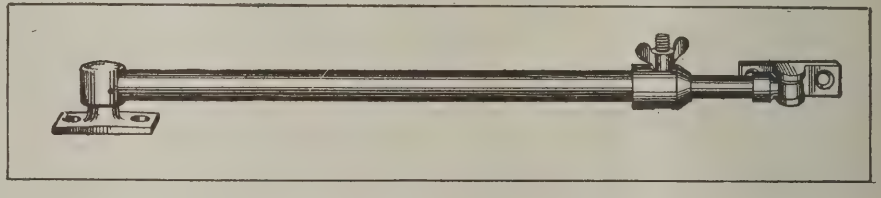


Fig. 3—The Universal Telescoping Casement Adjuster

Fireplace Fixtures

The fireplace is undoubtedly an important adjunct of the modern home and one of the perplexing parts of its construction is the correct width of throat. It stands to reason that efficiency and economy are promoted by the use of a damper, for the one sized throat is certainly not at its best under all conditions. A damper is just as useful in connection with a fireplace as with a stove. The claim is made that Stover Improved Dome Dampers permit the throat width to be changed according to weather conditions and as the fixture forms and proportions the throat itself, there

(*Continued on page* 80)

MEDUSA WATERPROOFING



Bungalow of W. D. Shoupe, Chicago Lawn, Illinois
Made Weather and Damp-proof by Medusa Waterproofing

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WHEN you are building concrete and stucco houses for *permanence,* there's one thing you must not overlook—and that is waterproofing. A builder is known by the houses he builds—and any number of contractors are building enviable reputations for themselves by making their houses weather-proof, storm-proof and damp-proof by the use of

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If you do, fill out the attached coupon and mail it to us today. We'll send you the Medusa Waterproofing booklet that is chuck full of interesting information which you can put into practical use. Fill out the coupon now.

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KOHLER WARE

The "Viceroy" *one-piece* built-in bath, shown in this illustration, is a remarkable achievement in the manufacture of enameled plumbing fixtures.

Patterns provide for right and left corner, recess and wall installation.

Owing to manufacturing economies the price is surprisingly modest.

All KOHLER WARE is of one quality—the highest. The permanent trademark, faint blue in the enamel of every KOHLER product, is our guarantee of excellence.

Write for a free copy of our interesting book, "KOHLER OF KOHLER." It contains illustrations of the many styles and types of KOHLER WARE.



"It's in the Kohler Enamel"

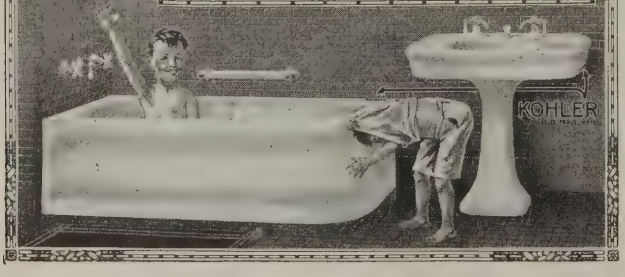
KOHLER CO.
Founded 1873
Kohler, Wis., U.S.A.
Shipping Point, Sheboygan, Wis.

BRANCHES

Boston	New York	Philadelphia	Pittsburgh
Atlanta	Detroit	Chicago	Indianapolis
St. Paul	St. Louis	Houston	San Francisco
Los Angeles		Seattle	London

Plate V-14-A
"Viceroy" Bath
[Patent Applied For]

Plate K-145-FA
"Belmore" Lavatory



is little opportunity for the mason to go astray when it is used. Many people like to avoid the dust and dirt incident to a fireplace by having it provided with an ash trap door, which permits the ashes to be dropped through the floor to the basement. In Catalog 1590 a new publication of the Stover Mfg. & Engine Co., 747 East Street, Freeport, Ill., these contrivances are described and illustrated by halftones and cross-sectional views of the fixtures in place. After the fireplace itself is constructed, there is an opportunity for modern equipment to facilitate the fire-building. Andirons of many styles, fire baskets, grates, spark and fire guards, screens, fireplace sets, wood holders, gas logs, etc., are all illustrated and described in the catalog under review. Prices are also given. The catalog shows a number of additions to the company's line.

New Baseboard Warm Air Register

Baseboard registers in connection with warm-air furnace heating systems are rapidly growing in popularity and in Fig. 4 we present a register of this type, which has recently been brought out by the Hart & Cooley Co., New Britain, Conn. The register is made in a variety of sizes which are classed as Nos. 141, 142¼, 143, 143½, 144 and 145, the right-hand figure in every instance being the size of extension beyond the face line of the riser with which the register may be connected, giving a very large boot opening into the bottom. An important feature of the construction is that it is made in two pieces—the frame proper,

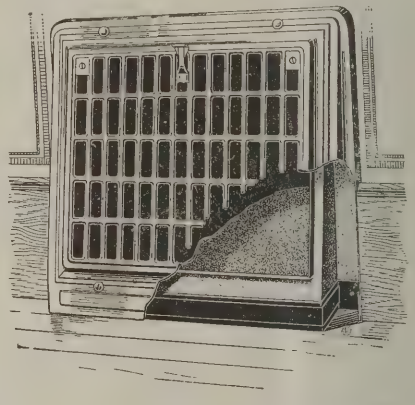


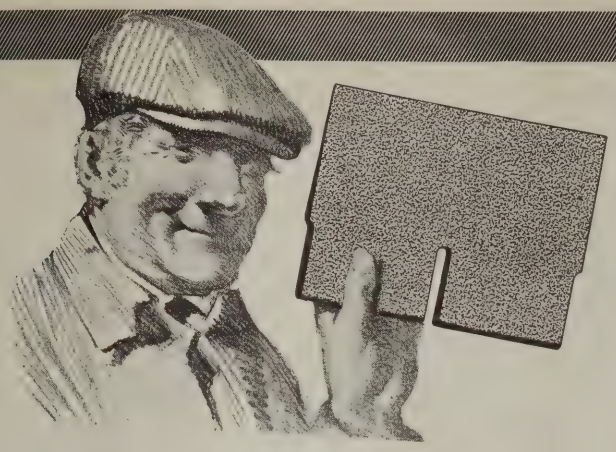
Fig. 4—New Baseboard Warm-Air Register

formed from a solid piece of metal, and the convex quick detachable face. For convenience in setting there is provided a steel gage, as shown at the bottom of the illustration, with a heavy black appearance, and above is the frame mentioned and in front of it is the detachable register face. The latter, as may be seen from the pattern, is intended to give a free air space equal to the largest boot with which it may be connected. The valve is of a single flat piece and arranged to be operated by hand or by the foot. The register box flanges of sheet metal may be turned over the edge of the register frame, making a tight job to prevent the leakage of air at points which would leave dust streaks on the wall. The detachable face may be removed by turning a rivet screw half a turn. Another point is that the distance between the open lattice work and the floor is sufficient to prevent annoyance from dust or dirt being swept into it in cleaning a room.

The "Ja-Nar" Automatic Room Temperature Regulator

Modern hygiene recognizes the value of an equable temperature in preserving health and human efficiency. Colds and many other ills are directly traceable to the sudden violent changes that often occur in the average home. A temperature regulator that can be applied to one radiator or many, that can be used in any one room of the house in which regulation of temperature is especially desired without going to the expense of putting in a complete temperature system and one that

(*Continued on page 82*)



"You can just bet my 'shingle' is hung out—it's all over town, and out in the country, too.

"And more of them are going up all the time—everywhere around here you will find the handsome red, gray and green roofs.

NEPONSET TWIN SHINGLES

"People in this locality don't worry any more about their roofing problems—they just put them up to me—for I am the Neponset Man.

"But I don't worry, either; my shingles are made of the same materials as in Paroid Roofing and I know that hundreds of roofs covered with Paroid are in perfect condition after 18 years' service.

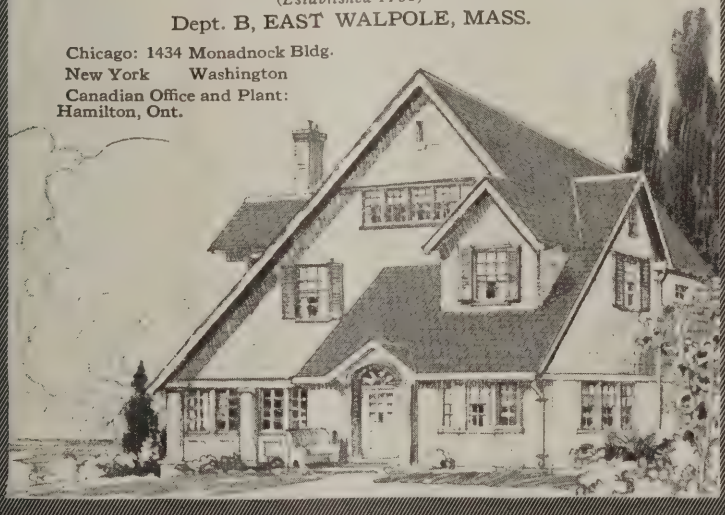
"Maybe you can become the Neponset Man in your section—try—send the coupon today."

BIRD & SON

(Established 1795)

Dept. B, EAST WALPOLE, MASS.

Chicago: 1434 Monadnock Bldg.
New York Washington
Canadian Office and Plant:
Hamilton, Ont.



NEPONSET WALL BOARD

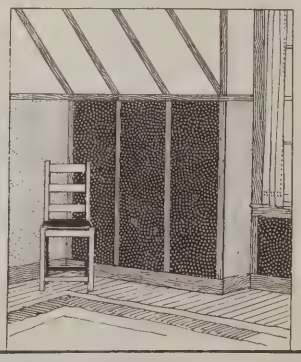
For Walls and Ceilings

is daily growing stronger as an important factor in the business of carpentry and building.

It takes the place of plaster and lath, and lumber for

Walls and Ceilings
Wainscoting
Partitions
Closets
Booths
Window Displays
and a thousand other uses

The coupon below will bring you full information about Neponset Wall Board as well as Neponset Shingles.



BIRD NEPONSET PRODUCTS

BIRD & SON, Dept. B, East Walpole, Mass.

Please send me full information about Neponset Shingles and Neponset Wall Board. Also a copy of your book "Repairing and Building." This request does not obligate me in any way.

Name .....

Address .....



OUR garage hardware is especially designed to accomplish its purpose. It is on sale by most hardware dealers and can be secured quickly and easily by contractors and builders.

Stanley Garage Hardware

is of special interest because it is a necessity for every modern garage. The Stanley Garage Door Holder, illustrated above, is an arm of steel which holds the door open, preventing it from slamming and injuring the car while entering or leaving.

There is nothing to break or get out of order. A pull at the chain releases the door and permits it to swing shut.

If you are not already familiar with this device, and the complete line of Stanley Garage Hardware, we suggest that you send for information.

Write today for illustrated booklet "E," on Stanley Garage Hardware.

Stanley Works

New Britain, Conn., U. S. A.

NEW YORK
100 Lafayette Street

CHICAGO
73 East Lake Street

will keep the temperature constantly at any desired degree between 60 and 80 deg. is certain to meet a demand that has been felt by many. Such a device, it is said, is the "Ja-Nar," described as "an automatic device for maintaining uniform room temperature" in buildings heated either by steam or hot water. It consists of a cabinet-looking covering made of furniture steel and fitting over the radiator, the size of which it closely approximates. The temperature is regulated by louvres which control the amount of air passing over the radiator so well that, it is said, the temperature will not vary more than one degree each way from the degree at which the device is set. The louvres are controlled by a "sylphon." This contains a metallic bellows inside of which is a volatile liquid which when heated gives off a vapor like steam and has a powerful expansive force. This liquid is said to be sensitive to very slight changes in temperature, never evaporates or changes form and therefore never needs renewal. The "Ja-Nar" is described and illustrated at length in a booklet entitled "The Ja-Nar" and the Sylphon Regulator is illustrated and described in "Ideal Sylphon Heat Regulators," both of which are being sent out by the Annex Co., Knoxville, Tenn.

"Northwestern" Concrete Mixers in Canada

A very gratifying demand for their concrete mixers is reported by the Northwestern Steel & Iron Works, Eau Claire, Wis. They state that these inquiries are coming not alone from domestic sources but also from



Fig. 5—"Northwestern" Concrete Mixers in Canada

Canada. A recent shipment to the Canadian Government consisted of Model 610, which has a capacity of 12 cu. ft. and weighs 6000 lbs. It was ordered to be sent by express—an indication of the anxiety of the Canadian authorities to get the machine at work as quickly as possible on permanent improvements for their largest concentration camp. Many "Northwestern" mixers are in use across the border and one of the popular styles owned by a prominent contractor of Montreal is shown in Fig. 5. All this is suggestive of the manner in which the "Northwestern" has made friends with Canadian contractors.

Catalog of Berger's Sheet Metal Products

An attractive publication of 184 pages neatly printed in black and red on white enameled stock and with a cover of heavy gray stock carrying a design on the front which typifies the steel industry, has just been issued from the press by the Berger Manufacturing Company, Canton, Ohio. It is known as catalog No. 10 and is regarded by the company as one of the most complete works on sheet metal products which it has ever issued. The company turns out a diversified line of sheet metal goods, among them being flat sheets, roofings and sidings, tin and terne plate, eaves trough, gutters, pipe, etc., ventilators, skylights and special work, galvanized cornices, finials, tinners' accessories, steel ceilings, metal lath, rein-

(*Continued on page* 84)

$834

300 Plans FREE



Contractors! Send for Our Two Big House Plan Books FREE!

Let these books do half your work and **add to your profits.** Over 300 home plans —all different—from **$300 up.** No other concern in America can give you the **Quick Action, Quality and Low Prices** that Gordon-Van Tine Co. offers.

The facts are that the Gordon-Van Tine Co. offers the **biggest, broadest, finest stock** of quality building material **on earth.**

Over 10,000 of the most successful contractors and carpenters in America, expert judges of values, keep our great catalog, valuable books and special bulletins on hand as a check and guide on **buying orders and estimates.**

Our immense plant has for years been built up with the main idea of getting materials to our customers quickly and right in every particular.

We actually carry everything our carpenter and contractor customers want—with ample facilities for also making special stuff quickly. Estimates furnished free.

We Ship Promptly to Anywhere You Live by Fast Freight —Safe Delivery, Quality and Satisfaction Guaranteed

Rush Orders are our specialty. *Our shipping service* is ideal. Our stocks are so complete, always, that no building job is ever held up. Get all your materials on the lot at *one time.* We carry in stock hundreds of bargains that cannot be bought elsewhere except *on special order* at high prices.

5000 Building Bargain Catalog FREE

Our Latest *Building Material Catalog*—156 pages—Color illustrated—shows everything needed by Carpenters and Contractors.

Ten Thousand contractors and carpenters buy practically *all* their building materials, lumber, hardware, paints, etc., direct from our catalog. Investigate good reasons why. Send the coupon.



Gordon-Van Tine Co.

Satisfaction Guaranteed or Money Back

In Business Half a Century **836 Federal Street, Davenport, Iowa**

GORDON-VAN TINE CO., 836 Federal St., Davenport, Iowa

Please send me **Free** the books checked.

- ☐ Building Material Bargain Catalog—Lumber, Millwork, Hardware, Paints, etc.
- ☐ Standard Home Plan Book
- ☐ Garages—Ready Cut and Portable
- ☐ Barn and Out-Building Plan Book
- ☐ Roofing Samples
- ☐ Summer Cottages
- ☐ Ready-Cut Home Plan Book

1978

Please send me specific information about.....

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Mention here articles in which you are most interested.

Name.....Street No.....

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Why are Wheelbarrows



Like Automobile Tires?

"People has got into the habit of measurin' the value of automobile tires by the number of miles they'll run, under certain road conditions, carrying a certain load.

"It's a good habit, if ye don't go too strong on the 'freak' performances the tire men talk about in their advertisin'.

"Now a feller ought to buy *wheelbarrows* on the same basis, pickin' out the ones that carries the heaviest tonnage the greatest number of miles, under the most contrary conditions.

"The costs and the profits on every job has got to be *measured by the barrow-load* of stuff carried. There ain't any other measure.

"Jest as there ain't any other measure for rubber tires except their mileage and the load *they* carry.

"All of which is another way of sayin' that the Barrow that piles up the most mileage and tonnage and days' work is the best investment.

"This means STERLING BARROWS, with their self-lubricated fiber bushings, their perfect balance, their out-and-out sturdiness, and long-lastingness.

"Take it from me, a cheap wheelbarrow, like a cheap automobile tire, is a pretty expensive thing fer any man."

—TIM TRUNDLE.

Send for Our Catalog No. 19

Sterling Wheelbarrow Co.

6201 Shenners Avenue, West Allis, Wis.

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

forcing materials, metal lumber, bins and shelving, metal furniture and lockers. These products are illustrated and described in the order named and in addition there are many tables scattered through the catalog which give it an added value. We understand that a copy will be sent free to any reader of THE BUILDING AGE who is interested in any of the products enumerated above.

Poster of the "Eveready" Saw Rig

The builder who has need of a saw rig in connection with his work will find much to interest him in a new poster issued by the Oshkosh Mfg. Co., 86 Buck Street, Oshkosh, Wis. Herein is described the Oshkosh "Eveready" Saw Rig and the appliances that can be affixed to it and which may also be attached to an old style machine at little expense. Halftone engravings of the machine and its attachments lend interest and include Rip and Cross Cut Saw, Jointer, Safety Guards for Jointer, Rabbeter, Mortiser, Horizontal and Vertical Boring Attachments, etc. The company is also sending forth a booklet entitled "Here Is the Evidence," which contains a long, though partial list of satisfied users of the "Eveready." There are also facsimiles of letters received from contractors, builders, etc., who commend the machine. Some of these letters describe interesting "kinks" or "wrinkles" which an inventive owner has utilized in connection with the saw rig.

New Butt for Accordion Doors

A butt especially designed for use on accordion doors is being placed upon the market by the Stanley Works, New Britain, Conn., and in Fig. 6 we present a general view of it. This style butt is offered both with

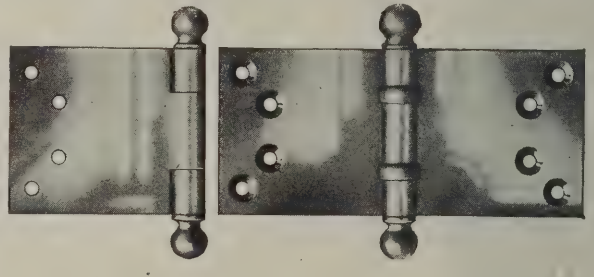


Fig. 6—View of New Accordion Door Butt

and without ball bearing washers, the latter style being equipped with the Stanley patented non-rising butt pin. When open, these accordion door butts have sufficient clearance to receive the combined thickness of the doors between the anchor door and the wall. The butts have a 3¼-in. throw, and may be used on doors of any thickness. They are particularly adaptable wherever a large offset is desirable. The butts are made in only one size, namely 2¾ x 6 in., and are packed one pair in a box, being furnished in any standand Stanley finish.

Burt Manufacturing Co. Enlarges Plant

Owing to the great increase in its business, the Burt Mfg. Co., Akron, Ohio, has found it necessary to enlarge its manufacturing facilities, and is just completing two large two-story additions to its already good-sized factory at Akron. It is also purchasing considerable up to date machinery, for on account of the determination to enlarge its scope of business, much new machinery will be required, for which orders have already been placed. In the past the company has devoted its efforts exclusively to the manufacture and sale of exhaust heads, ventilators and oil filters, but in the future it proposes to branch out into a general line of sheet metal work.

(*Continued on page* 86)

The Stiff 4-Ply Wallboard— Black Rock



Build Your Reputation on Black Rock

When You Build— Build Reputation

Building a reputation is a simple thing. All you need to do is to do what you have to do a little better than your competitor, and your fame grows apace.

The carpenters and builders who saw far enough ahead to interest themselves in Black Rock Wallboard, started then to build their reputations on a firm foundation.

The jobs that you do this year will either advertise you, or injure your reputation, five years from now. If you use Black Rock Wallboard—in 1920 people will point to you and say "There's a man who builds wisely and well."

As a man who is used to dealing in lumber, you will like the way Black Rock Wallboard works. It is as stiff as lumber. Moreover, it is the only board with a moisture-repellant black center.

The last word in wallboard

The reason why Black Rock has such properties of permanence is simply that the veneer process of combining the four plies makes Black Rock the stiffest and strongest wallboard. Incidentally, that's why it looks, works and lasts like high-grade kiln-dried finishing lumber.

Incidentally, that's why it will not warp, buckle, bulge or pull away from the nails. The very fact that by this new method Black Rock has been moisture-proofed eliminates the principal causes of contraction and expansion.

And the well-sized, smooth, "sanded-like" surface of Black Rock needs less paint, because no priming coat is necessary.

Black Rock Wallboard is something *new, different*—the last word in wallboard.

It will boost your reputation as a builder. It will bring you "repeat" business. You cannot afford not to know about Black Rock. Send postcard, or coupon, for free book and sample.

COUPON

Mail today to

Black Rock Wallboard Co.
1525 Ontario Place, Black Rock, N.Y.

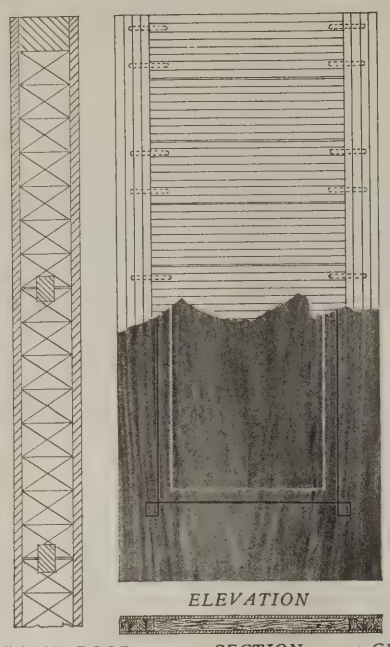
Send me free book and actual sample.

Name.....

Ad dress.....

BLACK ROCK WALLBOARD CO.
1525 Ontario Place
Black Rock . . . . New York

Process, trade-mark and black centre fully protected



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

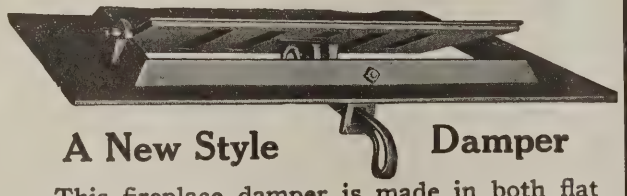
Manufactured by

HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

FIREPLACE
MATERIAL



A New Style Damper

This fireplace damper is made in both flat and dome styles. The lever sets under the first row of brick, unexposed, but very accessible and easily operated.

Also made with lower lever so a steel angle can be placed under edge of damper. We make several other style dampers.

Catalog 1590 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

Stover Mfg. & Eng. Co.
747 East Street
Freeport, Ill.

SEND COUPON TODAY
Stover Mfg. & Eng. Co., 747 East St., Freeport, Ill.
Send the undersigned information regarding your
Name .....
Business .....
Address .....

Catalog of the Majestic Company

The Majestic Company, Huntington, Ind., has recently issued a new catalog of Majestic modern building specialties. Illustrated and described are round Majestic hot-air heaters, square heaters, the Majestic "Duplex" system of heating, side wall and stack branches, first floor and second floor side wall and stack fittings, "Minneapolis" heat regulator for hot-air furnaces, Majestic coal chutes for residences and store buildings, the Majestic burglar-proof basement window, porch column bases and several types of built-in and underground garbage receivers.

Importance of Proper Crating of Goods

The Kohler Co., Kohler, Wis., manufacturers of enameled plumbing ware, has given considerable study to the problem of crating bathtubs, lavatories and sinks. A special crate has been devised for each piece of ware, a crate that is exactly adapted to it. one that will save space and weight and is economical in every respect. This becomes an important matter where rents are high and room, either in warehouses or plumbing establishments, is scarce.

Another feature that makes Kohler packing of advantage is the protection which it gives to the product. The crates are strong but light in weight, while adequate padding is an additional safeguard against damage.

Even the small ware, such as sinks, sink backs and drainboards, is packed in individual crates which are bundled together when shipment is made in lots. This allows the dealer to reship a single piece without the inconvenience or cost of recrating, while it does not demand an increase in storage space.

New Moulding for Wall Board

That wall board is effective and economical as an interior trim is evidenced by its rapidly growing popularity in all parts of the country. Its merits have been set forth from time to time in these columns and for several months past a most interesting serial relating to it has been published. With a view to facilitating the installation of the material, the W. R. Friedel Co., Memphis, Tenn., has devised what is described as the Friedel patent flange moulding, which represents the result of many years' experience with wall board and a thorough familiarity with the usual methods of applying it. Full details regarding the new moulding are to be found in an attractively printed booklet entitled, "The New Way." Crooked or irregular spaced studding, warped joists and various inaccuracies in framing work are claimed to cause no trouble when this moulding is used, for it is said to be entirely independent of headers and studs, the flange itself providing a suitable base for the wall board. The latter slips into grooves or flanges and is not nailed, so that expansion or contraction of the wall board will cause no trouble. Removal of the wall board is said to be easy at any time without its being injured. The elimination of nailing and extra framing and fitting of headers is said to materially reduce the cost of labor and practically offset the slight difference in price between the Friedel patent moulding and the ordinary kind. The material is provided in 10, 12, 14 and 16-ft. lengths in yellow pine, but special forms to detail can also be furnished in oak, gum, birch or mahogany. The booklet under review contains drawings showing the moulding and its manner of installation, halftones of houses and their interiors in which the material has been used, and other information likely to be of value to the carpenter and builder interested in wall board installation.

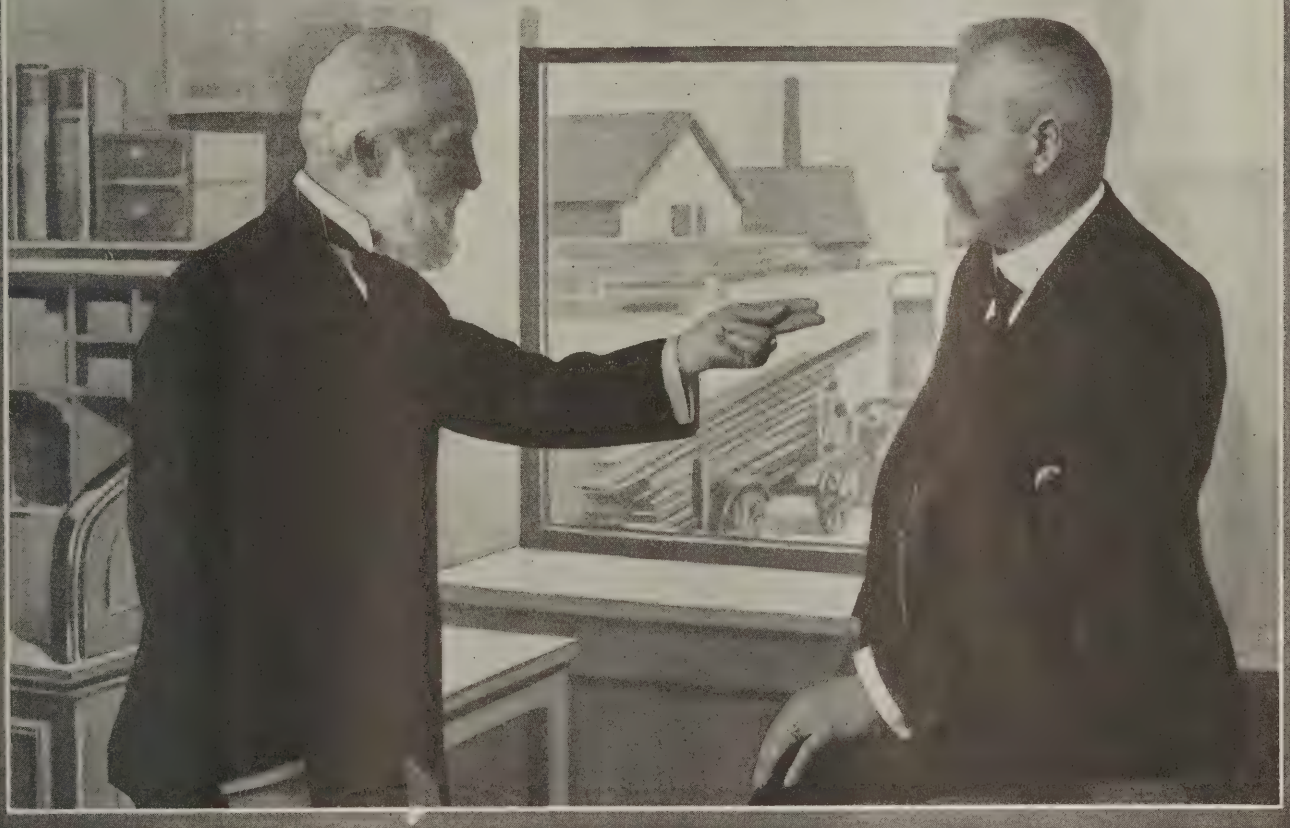
Motor Trucks vs. Horses

Many times during "hot spells" of the past few weeks the contractor or builder using a horse in connection with his business has probably had many opportunities for considering how unfavorably it compares with the

(*Continued on page* 88)

"THAT WAS IN 1856"

CLINTON WIRE LATH



"I HAVE USED CLINTON WIRE LATH SINCE IT WAS first offered to the public. That was in 1856. I am an old man and I can truthfully say that the entire history of light fireproof wall and ceiling construction has been enacted in my time."

"I give credit to *Clinton Wire Lath* for inaugurating this era and having been a most potent factor in accomplishing the wonderful advance of fireproof and slow burning construction that has been made in the last sixty years. I always specify *Clinton Wire Lath* because I know it is the best."

Send for our profusely illustrated book, "Successful Stucco Houses;" *also* "Clinton Handbook on Lath and Plaster." *Both mailed free.*

CLINTON WIRE CLOTH COMPANY

First Power Loom Weavers of Wire Cloth in the World

51 PARKER STREET :: CLINTON, MASSACHUSETTS

NEW YORK :: BOSTON :: CHICAGO

Makers of "Pompeiian" and "Golden Bronze" Screen Cloth, Clinton Painted Wire Screen Cloth, Clinton "Silver Finish" Screen Cloth, Clinton Poultry Netting. Clinton Electrically welded Fabric for reinforcing Concrete. Hunt Corner Bead, Tree Guards, Fence Gates, Clinton Perforated Steel Rubbish Burners, Perforated Metals, Perforated Grilles for all architectural purposes.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company



THE "BAILEY" IRON PLANE has been the STANDARD for over FORTY YEARS and has always maintained the leading position.

From time to time, other Iron Planes, made in imitation of this celebrated plane, have appeared upon the market.

These imitation Planes are often put up with numbers and labels designed to make the consumer think that he is obtaining the "BAILEY" Plane.

We are the sole manufacturers of the "BAILEY" Plane. Every Plane has the name "BAILEY" and the number cast in the bottom, and the name "STANLEY" is stamped on the cutter.

Always insist that your order be filled with Planes made by THE STANLEY RULE & LEVEL CO., which carry with them a GUARANTEE backed by a company that has been manufacturing Carpenters' and Mechanics' tools for over half a century.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

motor truck. On the other hand, when the thermometer directs its energies to keeping as low as possible, the slipping and falling of the horse makes it equally inefficient by comparison. That the motor truck is superior in weather more favorable to the horse is also generally conceded, and many builders are availing themselves of the machine's capacity for work. Information that will prove of interest to those contemplating the motorization of their equipment is contained in the last issue of *Traffic News*, the house organ of the Federal Motor Truck Co., Detroit, Mich., which is also sending forth a folder entitled, "Federals in Picture." This folder contains interesting halftone engravings of various unusual occupations in which "Federals" are engaged, such as street sprinklers, buses, etc., together with pictures of men prominent in the company and illustrations showing the growth of the plant. It is said that the first Federal truck made is still in a healthy state of working efficiency.

TRADE NOTES

Small-sized stucco houses seem to fill a need felt by many who desire a low cost dwelling of partial fireproof construction and which will require little or no expense for upkeep. Houses of this type are illustrated in a recent issue of *Expanded Metal Construction*, the house organ of the North Western Expanded Metal Co., 904 Old Colony Building, Chicago, Ill. The advantages of stucco, together with information concerning its application to this style of house, with or without sheathing boards, is contained in an article entitled, "The Small Stucco House." There is also a report of building conditions in different sections of the United States.

Prompt service and dependability are among the things emphasized in the August issue of *Door-Ways*, the house organ of the Richards-Wilcox Co., Aurora, Ill. The company states that it aims to supply the best in this direction and its Engineering Department is always ready to help solve any technical problem which may be submitted. There is also an article on garage doors which is of interest in cases where one or more trucks are to be housed.

The Flintkote Manufacturing Company, 98 Pearl Street, Boston, Mass., has issued a card containing samples about 2 in. square of its shingles. There are samples of slate surface and Rextile shingles in their various colors; Rex canvas roofing; valley and ridge strips; Rex Flintkote roofing; Rex black waterproof paper, etc.

The Highwood Dumbwaiter Company, Park Avenue, Leonia, New Jersey, has just issued a neat four-page folder giving brief specifications of its "Highwood" dumbwaiter. The claim is made that the material is all ready for erection and it is of such a nature that the dumbwaiter can be installed by anyone able to intelligently use a hammer. For shipment purposes the dumbwaiter car is used as a container for the ropes, hardware, machine, etc., thus reducing the cost of freight to a minimum.

Valuable advice for securing painting contracts from farmers is contained in the "Farm Painting Number" of the *Carter Times*, published every once in a while by the Carter White Lead Company, Chicago, Ill. There is also an article on how to break up white lead quickly, easily and smoothly, together with a practice estimate for calculating the amount of paint and labor necessary to cover a given area and the overhead expense, etc., which must be added if a profit is to be made.

The increasing popularity of concrete in the construction of country residences lends decided interest to the half-tone engravings of houses built of that material which are contained in the July issue of the *Medusa Review*, the house organ of the Sandusky Cement Co., 624 Engineers Building, Cleveland, Ohio. Other interesting material is also contained therein, including the description of how a St. Louis flat building was converted into a café and restaurant, Medusa

(*Continued on page* 90)



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Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

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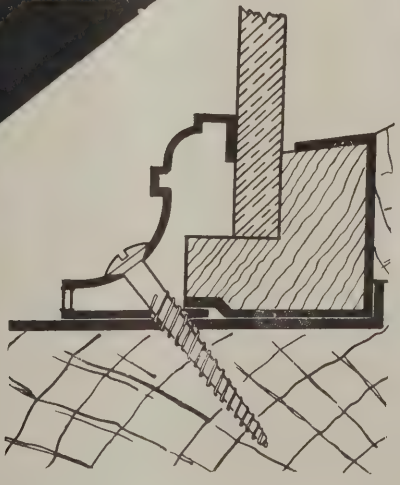
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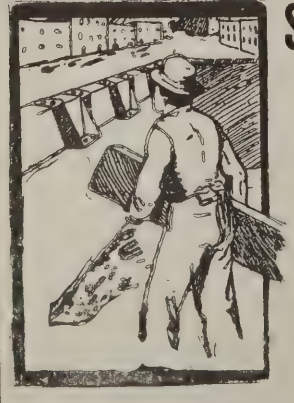
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Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, acauat load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

White Portland Cement helping to complete the transformation.

The annual outing of the employees of the Simonds Mfg. Co., Fitchburg, Mass., was held at Lake Dennison on Aug. 5, and the festivities were enjoyed by over 500. There were various sporting events besides the wood-sawing contest, in which, of course, Simonds cross-cut saws were used.

Manufacturers and others who are giving consideration to export opportunities will be interested in an announcement made to-day by Messrs. Gaston, Williams & Wigmore, Inc., 140 Broadway, New York City, that their Far Eastern Division, organized and equipped to develop markets for America's industries, will hereafter be in charge of Mesrs. Joseph J. Keegan and Hilliard J. Rosencrantz as their managing directors. Keegan and Rosencrantz have been prominently identified with American trade development in the Far Eastern countries for the past sixteen years, representing American manufacturers.

The Union Investment Company, home builders, located at 5122 West Stevens Street, Seattle, Wash., are about to erect a number of buildings, including several residences, and are in the market for building materials and equipment of all kinds. The company would therefore be glad to receive catalogs and samples from manufacturers of materials of this character.

A late issue of *The Dutch Boy Painter*, which is devoted to the interest of good painting and published by the National Lead Company, New York City, contains a great deal of interesting information which the builder as well as the painter cannot fail to appreciate. There is an article on the care of brushes, and another on painting stucco houses, the latter being especially valuable by reason of the extent to which stucco houses are being erected at the present time.

Architects and building contractors will find interesting material in the booklet of 100 pages issued under the title of "The Cement Gun," by the Cement-Gun Co., New York City. A description is given of the apparatus, process and product, and in connection therewith are a large number of photographic views showing the machines and their work. The booklet shows how concrete can be repaired, old frame buildings covered with cement, steel columns rendered rustproof, wooden piles made waterproof and protected against the inroads of teredos and limnoria—all by the "cement-shooting" of the "cement-gun."

Bird & Son, Dept. B, East Walpole, Mass., are distributing among architects and builders an attractive pamphlet, portions of which are printed in colors and relating to Neponset shingles, wall board and roofings. Illustrations for the most part are halftone engravings, but among the line drawings are several reproduced from the serial article running in THE BUILDING AGE on the use of wall board for various purposes. The make-up of the pamphlet is neat and attractive, and a copy of it will be sent to any reader who may make application for it.

Ed. H. Witte, a Kansas City engine expert, has just prepared a clever little book on engines that is likely to appeal to every carpenter-contractor, builder or others operating wood-working shops requiring the use of power. He states that he will be glad to furnish to those requesting it a copy of the book as long as the supply lasts, it being issued under the unique title of "Why." Anyone wishing a copy has only to write the word "Why" with his name and address on a postal card and send it to Mr. Witte, 3190 Oakland Avenue, Kansas City, Mo.

The Stowell Manufacturing Company, Jersey City, N. J., are increasing their facilities by the erection of a one-story reinforced concrete office building. The demand for the prepared asphalt roofings, asphalt shingles, etc., turned out by the company is constantly growing and the improvements noted have become imperative.

Expanded Metal Engineering Company, 101 Park Avenue, New York, is distributing among carpenters, builders and contractors a pamphlet containing that portion of the new building ordinances of New York City relating to the use of steelcrete mesh. Hereto-

(*Continued on page 92*)

A Good Mechanic Can Do a Job With Any Tool, But —

—not so well—not so quickly—not so easily as he can with a good tool

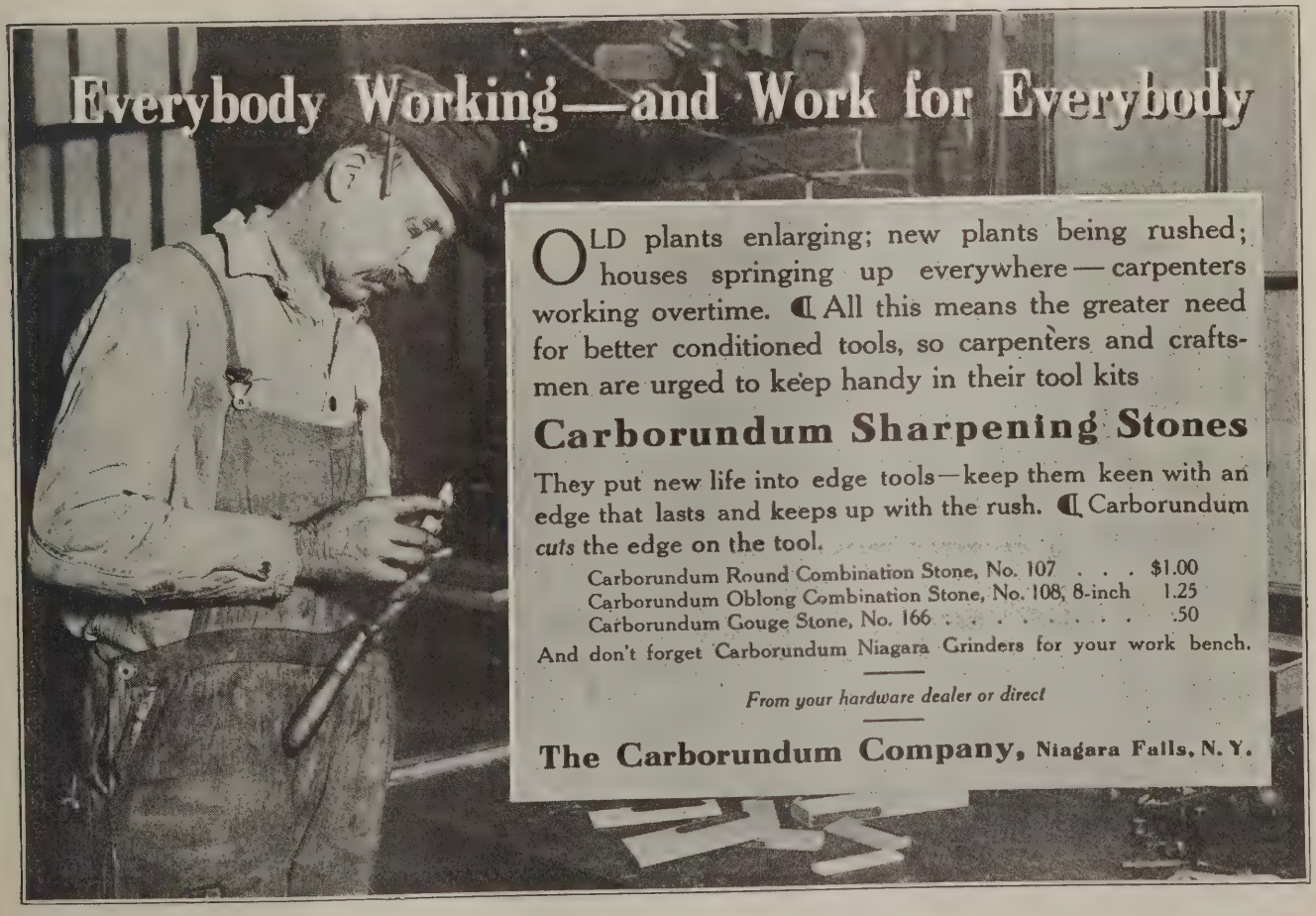


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And don't forget Carborundum Niagara Grinders for your work bench.

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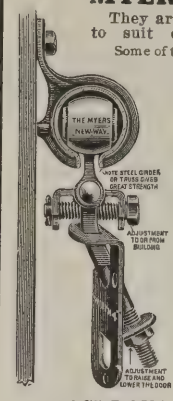
The Carborundum Company, Niagara Falls, N. Y.

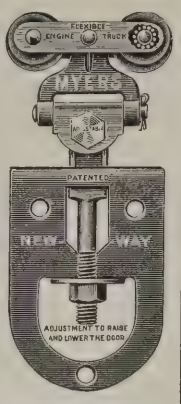
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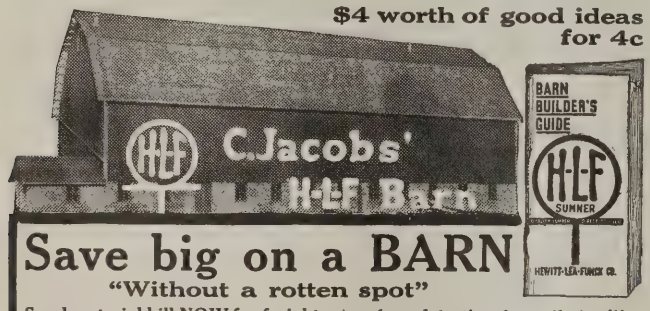
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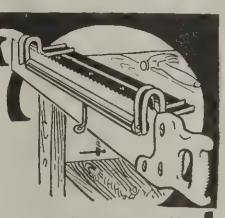
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fore in order to use any type of reinforcing in cinder-concrete construction in New York City, it was necessary to have a load test of the system made subject to the approval of the Building Department. Under the code recently adopted the above method of procedure has been abolished and a new method of computation has been devised whereby the allowable capacities of floor slabs may be determined without resorting to tests.

The Vinton Company, for some sixty years, associated with the building interests of Detroit, Mich., announces that it has withdrawn from construction work and contracting and will devote its activities hereafter to operations of an investment nature chiefly along real estate and building lines and including the financing of construction work.

The architectural firm of Perlstein & Perlstein has recently opened a branch office at 2517 Surf Avenue, Coney Island, N. Y., and will be glad to receive catalogues and samples from manufacturers of building materials.

Detroit Steel Products Company, Detroit, Mich., has just built two new concrete buildings to be used for the manufacture of Fenestra solid steel windows, these improvements increasing the capacity of the works approximately 100 per cent. Prospects for 1916 indicate that the year will show a gratifying increase over 1915, and the management of the company is therefore increasing the facilities to meet the demand.

The California Redwood Association, of San Francisco, Cal., has recently issued an attractive booklet containing matter which cannot fail to prove of value to any builder contemplating the use of redwood. In addition to calling attention to the many advantages claimed for this wood the booklet contains a large number of colored plates giving, as faithfully as the printer's art will permit, exact reproductions of redwood panels treated with different finishes, together with full directions for the treatment to produce these effects. There are a number of illustrations of fine homes finished in this wood, the buildings being located in all parts of the United States. The Redwood Association is installing an elaborate exhibit in the Pacific Building in Oakland, Cal., and is also sending out a great amount of other literature of interest to builders and contractors.

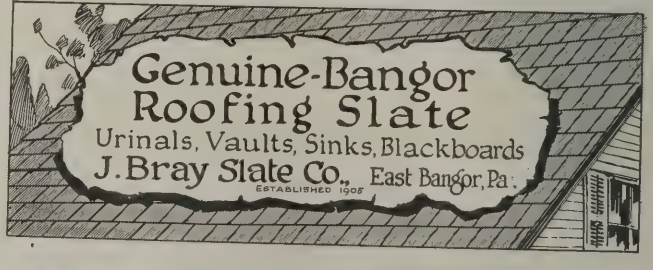
Henry J. Bacon, for fourteen years in charge of cabinet work at Morehouse Bros. Company, has just started in business for himself at 113 Columbia Street, Meriden, Conn. He will make a specialty of all classes of carpentry work.

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The Building Age

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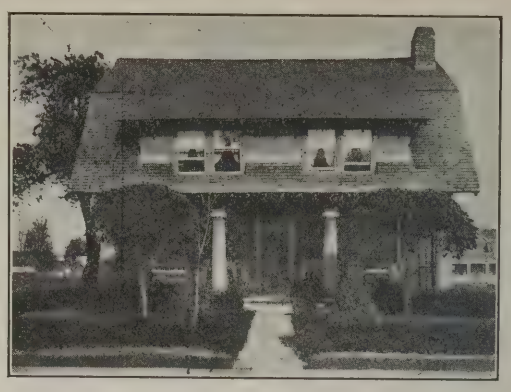
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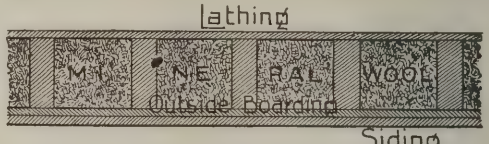
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NEW YORK, OCTOBER, 1916



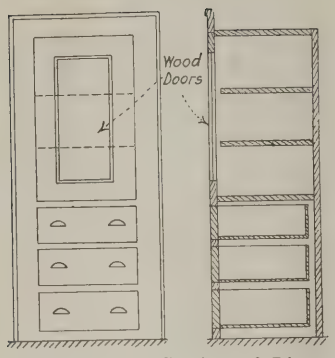
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INTERESTING EXAMPLE OF THE DUTCH COLONIAL TYPE—THE LIVING ROOM A FEATURE—COST $4,000

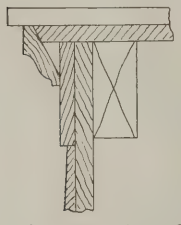
THE Colonial type of residence has attained wide popularity in all sections of the country by reason of the sincerity and honesty of purpose which its architecture seems to express. Among the several styles evolved from the same prototype, the Dutch Colonial holds its own, for the characteristic gambrel roof which immediately identifies it to the popular mind admits of an economy of plan and grace of outline that appeals powerfully to many. These considerations have caused us to select for illustration and description a Dutch Colonial house which embodies many interesting features.

The footings are of concrete composed of one part of Portland cement and four parts crushed stone. The foundation walls and piers, except the outside facing, are of hard burned hollow tile and brick. A concrete basement floor 3 in. thickness is laid on top of a 3-in. broken stone foundation. The lower 2 in. of the floor consists of one part of Portland cement, two parts sand and four parts of crushed stone and the 1-in. finishing coat contains equal parts of cement and sand.

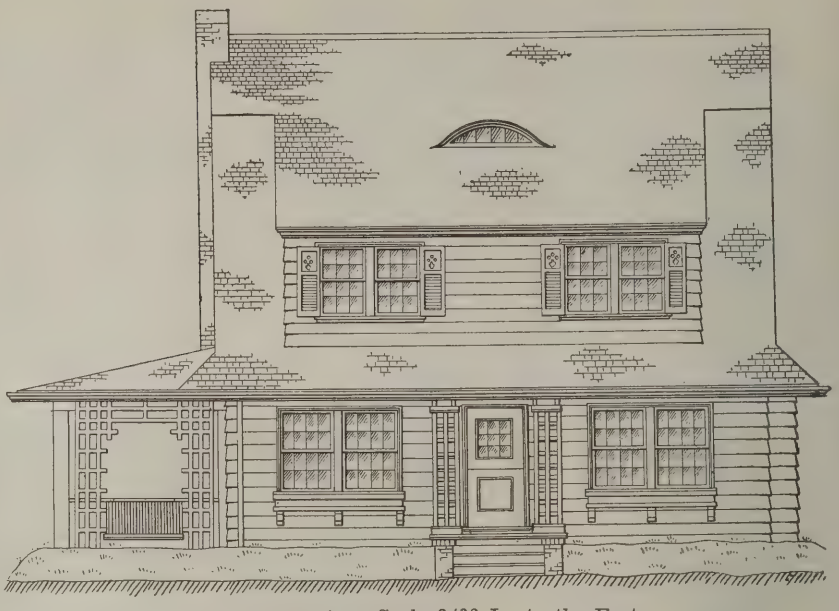
The joists and studs are of yellow pine placed 16 in. on centers. The first floor joists are 2x10 in. and the second floor and attic joists 2x8 in. The ceiling joists, and rafters are 2x4 in., the ridge poles 1x6 in., and the collar beams, plates and studs 2x4 in. The studs are double and braced at all corners. The double floor joists run lengthways under the partition and block joists run crossways. The floor joists where not in one piece are spiked together over the bearing, forming one continuous tie. All joist spans of 12 ft. or over have 2x3 in. bridging. The collar braces are nailed to the rafters half way between the ceiling joists



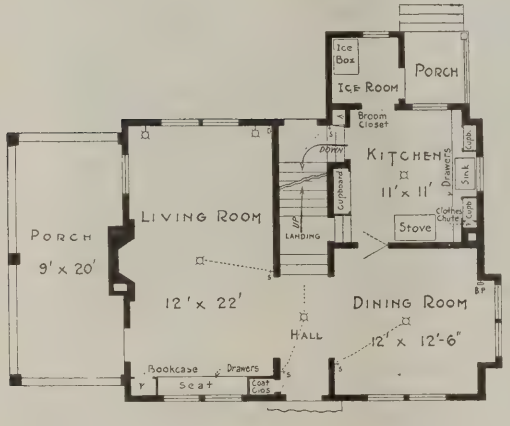
Elevation and Section of Linen Closet—Scale ¼ In. to the Foot



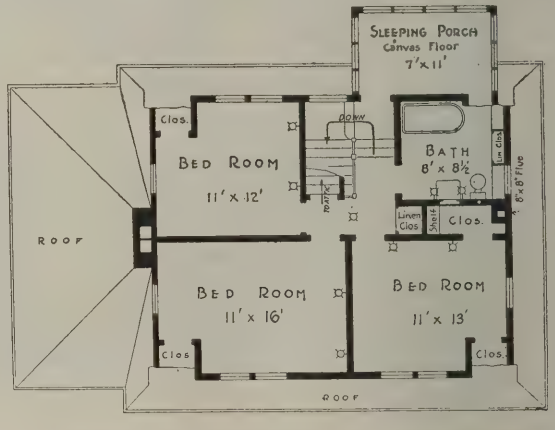
Detail of Barge Board—Scale 1½ In. to the Foot



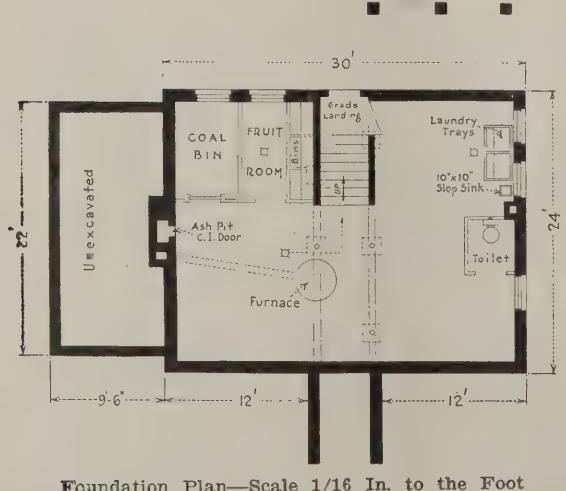
Front Elevation—Scale 3/32 In. to the Foot



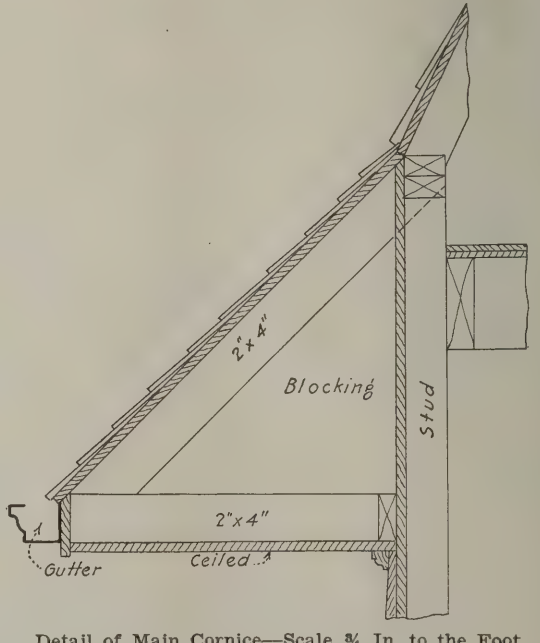
First Floor Plan—Scale 1/16 In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot



Foundation Plan—Scale 1/16 In. to the Foot



Detail of Main Cornice—Scale ¾ In. to the Foot

PLANS, ELEVATION AND MISCELLANEOUS CONSTRUCTIVE DETAILS

and ridge line. The rough underflooring for the first and second floors is 7/8x6 in. matched yellow pine laid at right angles to the joists with all butt joints over the joists. The finish floors are of 7/8x2½ in. select plain sawn oak except the attic floor which is yellow pine.

The exterior studs are covered by 7/8x8 in. shiplap sheathing boards, water-proof building paper and siding. The sides of the porch, including the porch rail and dormers, are covered with 10-in. cypress siding laid 9 in. to the weather. The exterior trim is for the most part 1⅛ in. cypress. The ceiling of the porches and soffit of the overhang is 7/8x2¼ in. yellow pine. The porches and rear steps are built of 1⅛x2¼-in. cypress.

The rafters are covered with 7/8x4 in. square-edged yellow pine roof boards surfaced on one side and spaced 2 in. apart, on which are laid red cedar shingles exposed 4½ in. to the weather. The shingles were dipped in Berry Brothers shingle stain before being laid. Scott's extra coated I. C. tin was used for all tin work except for the valley and gutters, which are of I. X. tin. The galvanized iron gutters are 5x3 in. moulded. The down spouts are connected to the sewer.

The sleeping porch is covered with 11-oz. canvas laid on white lead and oil, well tacked in place, the necessary flashing being provided so as to render the work thoroughly waterproof.

The exterior color combination involves white for the body of the house with the blinds and shingles green.

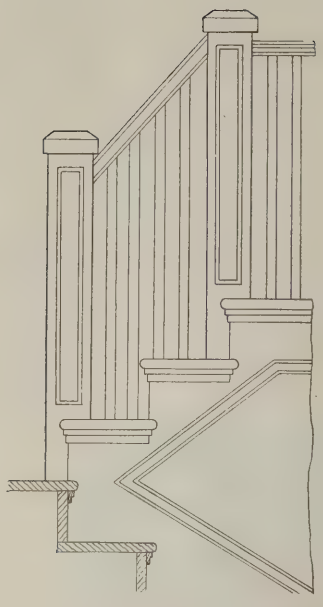
The exterior wood work in addition to the priming coat was painted with two coats of National Lead Company's "Dutch Boy" pure linseed oil and white lead, and the porch ceilings were given two coats of Berry Brothers' oil stain. The shingles were given one coat of Berry Brothers' shingle stain after they were laid, and the exterior varnished doors have a final coat of Spar varnish.

The house faces the east and has a wide porch extending the length of the south side and partly covered with lattice. A lattice is also built around the front door, as shown in the halftone picture of the exterior. The building is approximately 28 ft. 6 in. wide and 24 ft. deep. In the rear is a sleeping porch so located above the back porch and refrigerator room that it does not detract from the artistic appearance of the house. This porch, instead of being on a level with the second floor, is at a slightly lower level opening from the stair landing.

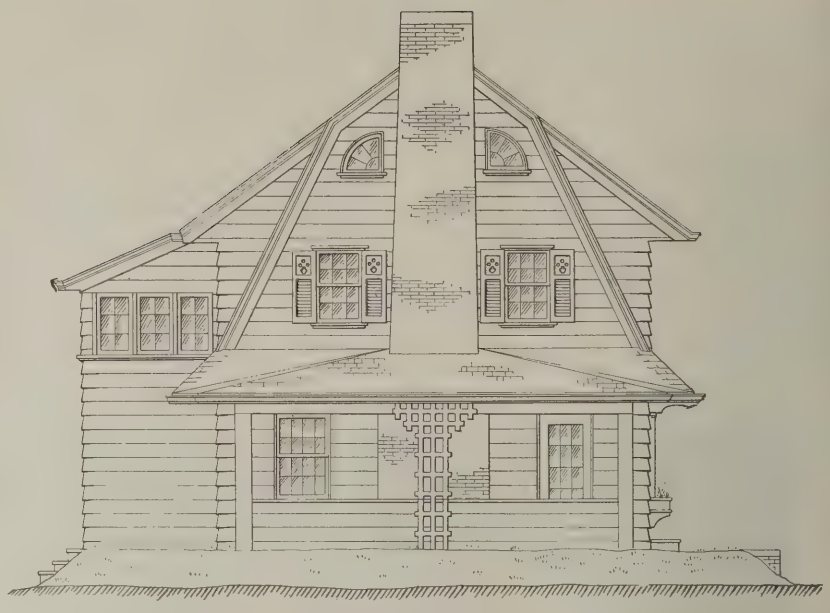


VIEW IN LIVING ROOM LOOKING ACROSS THE STAIR HALL INTO THE DINING ROOM

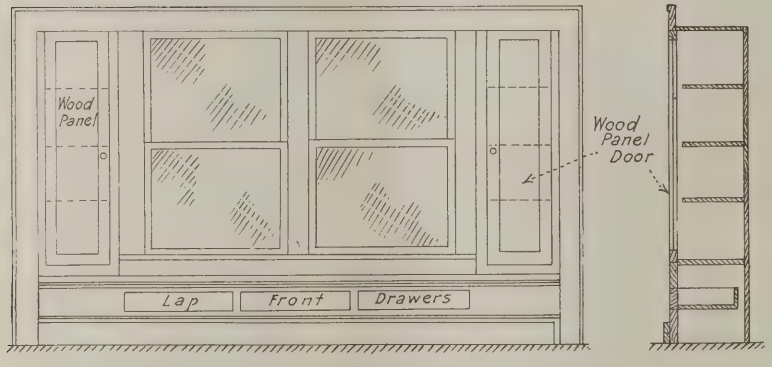
On entering the house the living room appears at the left, this measuring 12 ft. wide and 23 ft. long, or the full depth of the house. In the center on one side is a cozy red brick fireplace and mantel



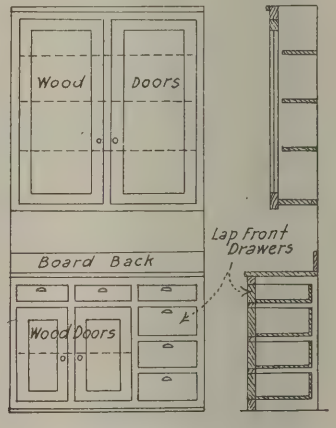
Detail of Stair Newel—Scale ½ In. to the Foot



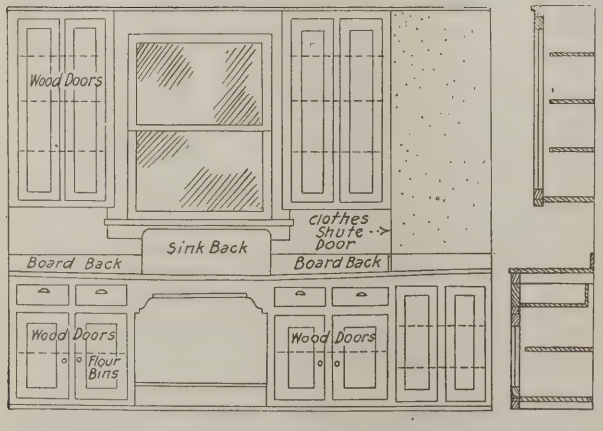
Side (Left) Elevation—Scale 3/32 In. to the Foot



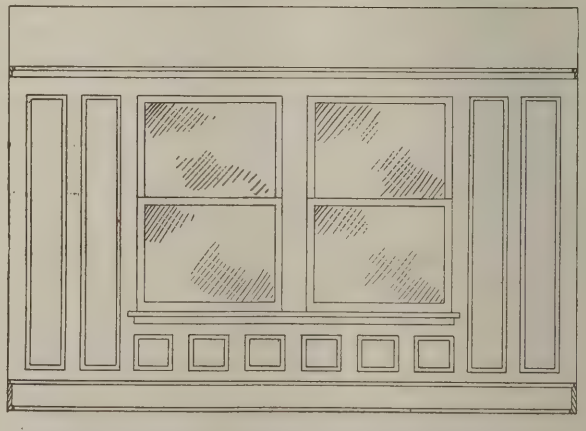
Elevation in the Living Room Showing Seat and Detail of Bookcase, Etc.—Scale ½ In. to the Foot



Elevation and Section of Kitchen Cupboard — Scale ¼ In. to the Foot



Elevation in Kitchen Looking Toward the Window Over the Sink and Showing Section of Right Hand Cupboard—Scale ¼ In. to the Foot



Elevation in Dining Room Looking Toward the Front Windows and Showing Detail of Wainscotting—Scale ¼ In. to the Foot

MISCELLANEOUS CONSTRUCTIVE DETAILS OF A HOUSE IN A CLEVELAND SUBURB

and on this side, near the front, is the door with twelve panes of glass, which leads on to the porch. The fireplace has a 6x3-in. red unglazed tile hearth resting on a 3-in. bed of cement grout the entire width of the mantel. Under the wide front windows are window seat and drawers, and the wall space on this side not taken up by the windows is filled with bookcases on one side and a coat closet on the opposite side. The latter adjoins the front hall into which it opens, having a false door in the living room corresponding to the bookcase door.

The dining room at the right of the hall is approximately 12 ft. wide and 12 ft. 8 in. deep. The stairway at the back of the center hall is unusually wide. The kitchen adjacent to and back of the dining room is conveniently arranged, commodious and well lighted, and has a built-in cupboard on each side of the sink on one side and a third cupboard on the opposite side with galvanized clothes chute leading to the basement. A narrow stairway leads from the kitchen to join the main stairway at the landing. One door leads from the kitchen to the cellar and back entrance and another to the refrigerator room and a back porch 5 ft. 6 in. wide with steps the width of the porch.

The walls are covered with one coat of Tiger brand hydrated lime plaster with a finishing coat of Tiger brand White Rock finish. The bath room and kitchen are wainscoted 4½ ft. high with Best Brothers cream cement ruled into 6x3-in. blocks to represent tile.

The hall, living room and dining room are finished in plain sawn oak and the second floor in birch. The remainder of the trim is slash grain Georgia pine. The dining room has wood wainscoting extending to about 18 in. from the ceiling.

All the first floor doors are 1¾ in. in thickness. The front entrance door is of Dutch design veneered in quarter sawn oak and with separate upper and lower sections with thin American plate glass panels set in the upper section with wood stops in muntins 3-16 in. between the glass. A "Korelock" door veneered in oak and having glass panels affords communication between the living room and porch and a similar door leads from the stair landing to the sleeping porch. The remainder of the doors are of Korelock type, those on the first floor matching the rooms they face and those on the second floor 1⅜ in. in thickness being veneered in birch. All the windows have 1⅛ in. rolled slat blinds with a solid upper panel. The blinds on the front of the house do not close.



VIEW IN LIVING ROOM OF HOUSE IN A CLEVELAND SUBURB, LOOKING TOWARD THE FRONT

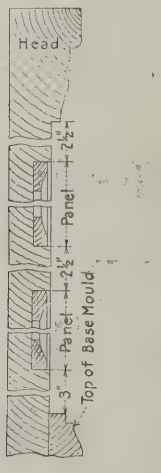
The oak floors were given one coat of Berry Brothers' paste filler, followed with two coats of Berry Brothers' floor wax rubbed with a weighted brush. The birch doors received one coat of shellac and two coats of Luxeberry wood finish, the last coat flat. The doors were sandpapered between coats. The oak trim and doors on the lower floor received one coat of stain, one coat of paste filler and two coats of wax, all of Berry Brothers make. The entire trim on the second floor is white, the bed rooms and bath room being given three coats of white enameled primer, followed by two coats of Luxeberry white enamel.

The main stair treads to the second floor are 1⅛ in. oak with ⅞-in. oak risers. The rear stairs are of yellow pine and have 1⅛-in. treads and risers. The closets are finished the same as the rooms in which they open and are provided with ⅞x12-in. shelves.

The arrangement of the second floor includes two bed rooms across the front of the house, another at the rear and a large bath room at the right, all connecting with a central hall wherein is provided a large linen closet conveniently placed both as regards bath and bed rooms. All the bed rooms have fair-sized closets and the closet door in one of the front rooms is fitted with a full-length mirror. The sleeping porch is also reached from this hall.

The bath room is equipped with modern fixtures, among which is a medicine cabinet with a pensive water closet. The kitchen sink has a Kohler 22x30-in. porcelain-enameled sink. The building is piped for gas and wired for electricity.

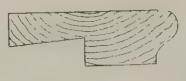
The house here described is located at 1400 Noble Road, Cleveland Heights, a suburb of Cleveland, Ohio, and is occupied by the owner, W. G. Grayell. The plans and specifications were prepared by the John Henry Newson Company, architects, 1027 Williamson Building, Cleveland, Ohio, and they state that under ordinary conditions the house can be erected in that section of the country at a cost ranging from $4,000 to $4,500.



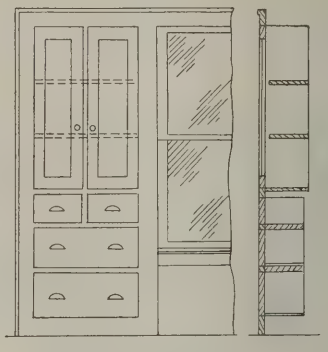
Vertical Cross-Section Through Wainscotting in the Dining Room—Scale 3 In. to the Foot



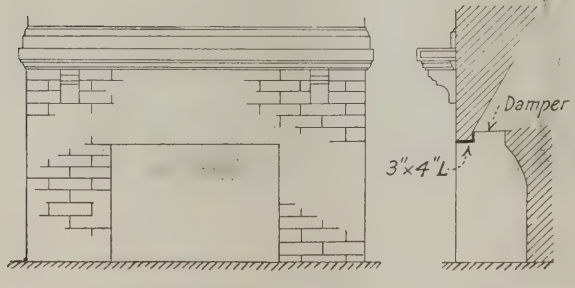
Detail of Base—Scale 3 In. to the Foot



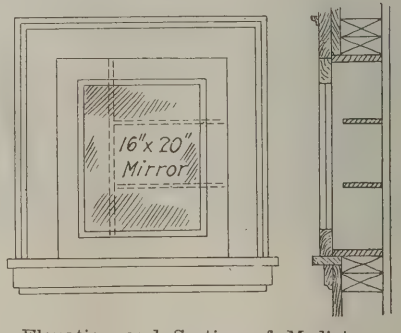
Detail of Window Stool—Scale 3 In. to the Foot



Elevation and Section of Linen Closet in Bathroom—Scale ¼ In. to the Foot



Elevation and Section of Open Fireplace in the Living Room—Scale ¼ In. to the Foot



Elevation and Section of Medicine Cabinet in the Bathroom—Scale ½ In. to the Foot

MISCELLANEOUS CONSTRUCTIVE DETAILS OF HOUSE IN A CLEVELAND SUBURB

20x24-in. plate-glass mirror in the door, a 5½-ft. Kohler "Baroness" porcelain enameled tub, a Speakman shower and Trenton Pottery Company "Raleigh" Vitras china lavatory and Liwelco closets and Bellemeade tank. The bath room has a floor of 1-in. white hexagon tile laid on 3 in. of cement grout.

The house is heated with a D. E. Henry Company 26-in. Moncrief combination gas and coal furnace with Perfection wall pipe with black japanned registers. To the furnace is connected a 40-gal. Hoffman water heater.

In the basement there is also a two-part stone laundry tub, a two-burner hot plate and an inex-

The builder executing the work was Fred S. Wallace, 13701 Kinsman Road, Cleveland, Ohio.

"Colorado architects some time ago conceived the idea that they could do much to improve architecture in the rural district. We believe," says Secretary Manning of the Colorado Chapter of the American Institute of Architects, "that we can accomplish this purpose by devising a series of plans of various types of farm buildings and country homes, which can be placed at the farmers' disposal at a minimum of expense. In this manner he will be able to build not only more substantial structures but more beautiful and comfortable ones."

HOW COST OF BUILDING MAY BE REDUCED

AN ECONOMY IN CONSTRUCTION WHICH COMES FROM THE USE OF BETTER PLANS AND SPECIFICATIONS

By Albert M. Wolf



COMPARATIVELY few house-builders realize that extra money spent on more complete and detailed plans, than are in general used for residence construction, results in better buildings, tends to eliminate high and unbalanced bids, as well as the vexing and costly "extras" which are the bane of a house-builder. The prevailing idea seems to be that if too much detail is shown on the plans, the contractor will include items in his estimate which he would otherwise omit. This may be true in a few isolated cases, but in general such a policy acts more or less as a boomerang, for before the building is finished, the contractor has accumulated such a bill of "extras" as to make the final cost much more than it should be. In fact, this has become so typical of residence construction that when one speaks of building, the first question asked is, "Have you allowed enough for the 'extras' which are sure to develop?"

WHY POOR PLANS ARE OFTEN USED

It is indeed regrettable that such a state of affairs should exist, but it does, and the blame rests with the owners and architects, sometimes with one or the other, and sometimes with both. Most persons when desiring to build a house want to secure plans at just as low a price as possible, since they figure that plans are no tangible asset as far as the completed house is concerned. To meet this demand, there have sprung up in various parts of the country architectural drafting firms and plan bureaus catering to this class of trade.

The plans and specifications furnished by these firms are often not much more than what an architect would call study plans and outline specifications, for details are for the most part left entirely to the imagination of the contractor, and if he be unscrupulous the owner suffers during the building process, both in quality of work and through the numerous extras.

WHY SO MANY CHANGES ARE MADE

Then, again, people decide to build and want to start work at once; they consult an architect or builder before they have fully made up their minds as to the general layout, and as the construction proceeds they see things which do not meet their fancy, and changes must be made. This condition is probably due in a measure also to the inability of most people to visualize, or, as we say, to picture in their mind's eye just how the interior of a residence will appear, with the plans as the only basis for the imagination. This is also the reason why so many people select some house previously built, if it strikes their particular fancy, and have one built along the same lines, possibly without anything more than a floor plan and a few sheets of specifications as a guide. As the construction proceeds a thousand and one little points come up as to which way the work shall be done, but not having a rigid specification the owner must take whatever the contractor desires to furnish, or pay for an "extra" if the work is carried out in the manner he (the owner) desires.

DETAILS OF HOUSE CONSTRUCTION

Residence construction includes so many different trades and so many classes of work that just as much detail and sometimes more is required in the plans and specifications as in those for office and manufacturing buildings. If such work is taken by the architect on a percentage basis (that is, his fee is to be a certain percentage, say 5 per cent, of the cost for ordinary residence work) he cannot make very much profit, since the cost of getting out plans and of the supervision is relatively high as compared with larger work. This has led many architects to ignore residence work entirely or to turn out "sketch plans" and outline specifications which are more in keeping with the fee to be received.

NO GAIN IN USING INCOMPLETE PLANS

Assuming for a moment that lower bids are occasionally obtained by the use of incomplete and poorly detailed plans, it cannot be denied that if the contractor has to furnish more under such a contract than he originally intended he will be rather inclined to add enough to cover all "contingencies" the next time.

Should those owners and architects who are believers in the use of sketch plans for bidding purposes, try the other method—that of getting more complete plans which would leave no doubt in the contractors' minds as to what is desired—they would soon find that the contract price in such cases represents very nearly the final cost instead of only a portion of the ultimate cost. This is the result of eliminating the source for "profitable extras" to the contractor by specifying definitely and showing in detail just what is required and not trying to cover things not specified or clearly shown, by "blanket clauses" such as "The contractor shall furnish all material and labor necessary to fully

execute the work in accordance with the intent of the plans and specifications."

The architect should know exactly what is required and it is his duty to clearly show or specify everything necessary to completely construct the building. Now by this is not meant the writing of a voluminous specification covering points which should be clearly shown on the plans. The specifications should cover general conditions of contract, quality of materials, methods of executing certain classes of special work and such other construction features as cannot be readily shown on plans without the use of long and wordy "notes."

POINTS SPECIFICATIONS SHOULD COVER

For the General Conditions of contract, forming part of the specifications, the Standard Forms of the American Institute of Architects, or the Illinois Building Contract Documents, are recommended as being very carefully drawn up and so complete as to cover all points likely to arise in the interpretation of specifications and execution of contract. Most specifications omit such important features as precedence of drawings, condemnation and correction of defective work, changes in work, additions and deductions, arbitration of differences, right to terminate contract, and supervision. The Forms mentioned above cover these very explicitly, in addition to many others, and herein lies their value as a safeguard to the interests of the owner.

These Forms can be obtained in printed form in several different sized sheets so as to be readily incorporated with the usual typewritten detail specifications. Their adoption by architects of recognized high standing is a demonstration of their worth and the writer would recommend them for use in residence contracts and specifications in order to avoid difficulties encountered if the contractor is inclined to disregard the specifications.

The general plans sent to bidders need not show all large and full scale details which will be necessary to carry out the work, but sufficient detail should be shown to allow the contractor to accurately take off the quantities of materials without any stretch of imagination on his part as to what the architect had in mind when he drew up the plans.

SCOPE AND GENERAL MAKE-UP OF PLANS

For an ordinary residence the bidding plans should comprise:

1.—Plat plan, showing location of house on the lot, the general ground elevation at various points, and the relative elevation of basement floors, kind of soil to be encountered, and enough data so that the amount of excavation can be readily computed.

2.—Basement and foundation plan, showing sizes of all wall footings, piers, location of all heating and plumbing fixtures and the underground piping.

3.—Floor plans, giving all necessary dimensions to accurately locate all partitions and openings, sizes of all doors, kind of plaster finish and trim in the various rooms, location of all plumbing and lighting fixtures, all radiators or heating flues, all built-in fixtures such as bookcases, window seats, buffets, wardrobes, linen closets, clothes chutes, ice-box, cupboards, and shelving.

4.—Roof plans, showing type of roofing, valleys to be flashed, detail of covering for hips and ridges, balloon strainers in downspouts, skylights, etc. It may also show any special work in attic.

5.—Elevations of all sides of the building, showing the sizes and type of all windows and interior doors, exterior finish, downspout locations and details, slope and general lines of roof, and heights of various stories.

6.—Detail sheets, showing sections of the building disclosing typical or special features of construction; window frame, lintel, and sash details, details of floor and wall construction (if of concrete as is now becoming popular). On one of the detail sheets (if more than one is required), should be shown the details, to a fairly large scale, of the millwork, including various parts of trim and all cabinet work.

PLANS SHOULD SHOW AS MUCH AS POSSIBLE

It should be borne in mind when drawing up plans, that contractors, especially sub-contractors, are very lax in reading and following the specifications, and that for this reason as much should be shown on plans as can consistently be done. For example, the sheet metal contractor is very likely to disregard the specifications and refer to the plans entirely while taking off his quantities, and as a result if nothing is shown to guide him, he will estimate and bid on whatever quality of material he desires to furnish. To avoid mistakes then, the size, weight and detail of all conductor pipes gutters, cornices, ridge rolls, valley flashing, etc., should be indicated on plans and not described in the specifications. For the same reason the various kinds and thickness of glass, special notes on millwork, notes on tilework, notes on methods of laying up special brickwork, terra cotta, etc., should be plainly shown on the plans, instead of trusting to luck that the specifications will be followed in the way that they should.

If carried out as enumerated above the sheets of plans for a residence will be more numerous than is usually the case, and consequently will cost more. This extra expenditure, however, is justified in view of the fact that on a seven-room bungalow, 55 ft. x 30 ft. (exclusive of wings), built by the writer and fitted with all the most modern conveniences, not one cent was paid out for extras.

In this case the writer had trouble getting bids from contractors who were at any time ready and willing to take jobs based on mere sketch plans. Either they did not know how to estimate a job when all details were given, or else they saw no chance of substitution or "extras" and consequently did not care for the job. No trouble was experienced in getting honest contractors to bid, for they could at once see that they were bidding on a definite proposition, and not one which depended entirely on the state of mind of the owner or architect.

The writer further believes that if more study and care was exercised in the making of plans, better buildings would result and cost data at our disposal would be of more value.



SOME ASPECTS OF MODERN SHINGLING*

SOME INTERESTING INFORMATION RELATIVE TO THE METHODS OF SHINGLING VALLEYS—THE MANNER OF FLASHING

By Edward H. Crussell



THERE are two general methods of shingling valleys — open and close. In the open valley a space is left, from 2 to 6 in. wide, forming a sort of gutter from the eaves to the top of the valley. In the close valley the shingles come close together in the center. Both styles need flashing to make them weatherproof, and for this purpose sheet tin or galvanized iron is generally used.

For the open valley, the flashing is locked, or riveted, and soldered together so as to make a continuous strip the full length of the valley. This is laid on the roof boards, and after being pressed into place is fastened with a few nails driven through its outer edge.

The close valley can be flashed in the same manner, or what is called course flashing may be used instead of it. The latter consists of sheets of tin, about 10 x 14 inches in size, which are worked in with the courses of shingles as they are laid. These pieces of tin are known as tin shingles; they should be folded so that the 10-inch way extends along the valley and placed so that their lower edges just come even with the lower edges of the courses of shingles *under* which they are laid. A tin shingle should be placed under every course.

Some workmen place the tin shingle so that it comes even with the lower edge of the course over which it is laid, thus exposing from 4 to 5 inches of the tin shingle. Nothing is gained by this method and the appearance of the finished work is very often marred by it, yet this is the method advocated in one of the best works on building construction published. On roofs of unequal pitch, the width of the courses must be varied on one side or the other so as to make them meet in the valley, otherwise course flashing cannot be used.

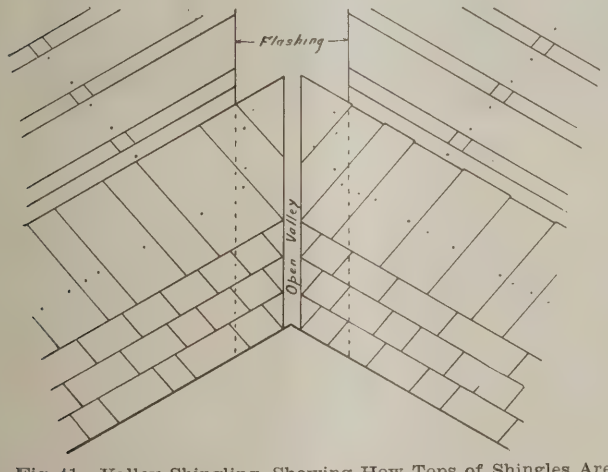


Fig. 41—Valley Shingling, Showing How Tops of Shingles Are Kept Even

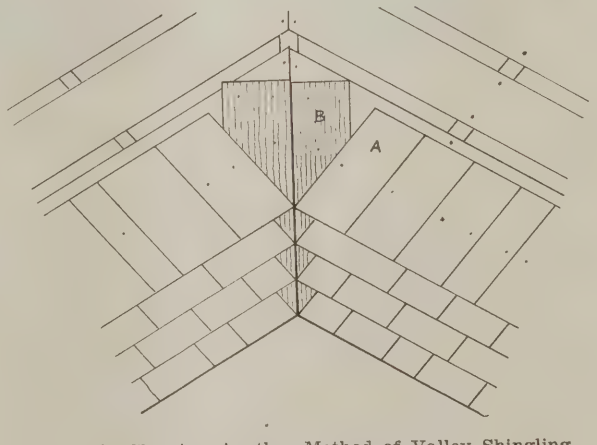


Fig. 42—Showing Another Method of Valley Shingling

There is no difficulty in applying the strip flashing; the only thing to be remembered is to place the flashing the right way of the lap; that is, so that if the solder in the joints should let go, the water will run over the joint instead of into it. The flashing should be from 16 to 20 inches wide, the low roof pitch taking the wide flashing.

*Copyrighted, 1916, by Edward H. Crussell.

In shingling the valley, care should be taken to see that the nails are only driven through the outer edge of the flashing, and the most important thing for the novice to remember is, that the tops of the shingles must be kept even, not the butts.

Many a beginner has been tripped up by this simple little matter, and many are the stories the old-timers tell of some greenhorn keeping the butts even, until the shingles in the valley were from 6 to 20 inches thick.

In Fig. 41 is shown the shingling of a valley and how, by keeping the tops even, the shingles are run out to a feather edge. These small pieces of shingle are difficult to cut, hard to nail (through the flashing), and entail a lot of waste unless there is a hip on the same roof; in which case, the pieces cut from the valley shingles may be used on the hip and *vice versa*.

A different method of cutting the valley shingles is shown in Fig. 42. This method is condemned by some, chiefly because the grain of the shingle runs up and down the valley instead of up and down the roof. Those who condemn the method evidently overlook the fact that only a very small portion of this shingle is exposed, and, considering the ease of fitting it, as compared with Fig. 41, the present writer's opinion is that it is very much the better method of the two.

The manner of working Fig. 42 is shown quite clearly in the illustration. A straight shingle *A* is first laid with its lower inner corner to the line of the valley; a *wide* shingle is then trimmed with the hatchet to fit against it, as shown at *B*, and that is all there is to it. The next course is laid in the same way—first the straight shingle and then the beveled, and so on to the finish. The shaded portions on the lower courses of Fig. 42, show all that is exposed of the beveled shingles in the finished roof. A short, straight edge is needed for lining the courses at the valley; it is used by laying it against the butts of the shingles already laid. The shingle *A* is brought to the center line of the valley for a close valley, and to the side line for an open valley.

The usual method of laying an open valley is to snap two chalk lines up the valley, allowing for the necessary width of opening. It is an exceedingly difficult thing to shingle to a line in this place, partly because the upper edge of the shingles (or the edge which shows) is an inch or so above the line, but more because the lines are sure to be rubbed out before the valley is half finished. Open valleys with crooked edges seem to be the rule rather than the exception and it is no unusual thing to find them wider in the center than they are at either end.

The easiest method of lining an open valley is to lay a stick of timber, such as a 2 x 4, up the center of the valley, bracing it in position with a few pieces of shingle. Even where a tapered valley is required (one wider at the bottom than at the top) it is better to cut a pattern to the proper taper than to try and shingle to a line. A trial of both methods will convince the most skeptical.



FIG. 43—ROOF DORMER WITH SHINGLED WALLS

An item of shingling likely to prove a stumbling-block to the inexperienced is to be found on the dormer window shown in the picture Fig. 43. There is no horizontal line anywhere on the side of this dormer and a level is needed for lining the courses. The tops of the courses must be kept even, as shown in Fig. 44, although the tendency to run them up is even stronger here than at the valley.

Some little calculation and forethought are needed in working on a roof of this kind. The main roof must, of course, be shingled first, and the upper portion of it, under the dormer overhang, and also

the side walls of the dormer, should be shingled before the dormer is roofed in. Then the main roof must wait until the dormer is shingled, so that the upper end of it may all be finished at the same time.

The manner of flashing between the main roof

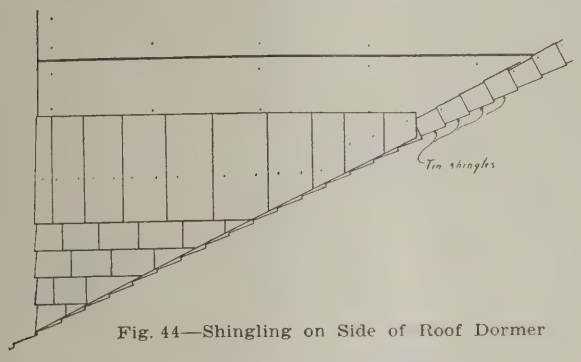


Fig. 44—Shingling on Side of Roof Dormer

and the sides of the dormer is shown in the upper portion of Fig. 44. A tin shingle 7 x 7 inches in size* is bent at right angles and worked into each course of the shingles on the main roof as they are laid, in the same manner as explained for the valley, or so that the lower edge of the tin shingle comes even with the lower edge of the shingle that is laid over it. This method of flashing should be used wherever a shingled roof butts against a perpendicular wall, as for instance the roof of a one-story extension against the wall of the main building. If the wall of the main building is covered with siding or clapboards, the flashing should be placed so as to go behind it, but sometimes, especially on repair work or alterations, the arrangement pictured in Fig. 45 is employed. The flashing is placed on the outside of the siding and is closely nailed to it, after which a member, which we may perhaps term a base, of the same thickness as the corner boards, and with a beveled upper edge, is nailed in place over it. The upper edge of this member should also be covered with a narrow strip of flashing. Tin shingles, used as in Fig. 44, is a

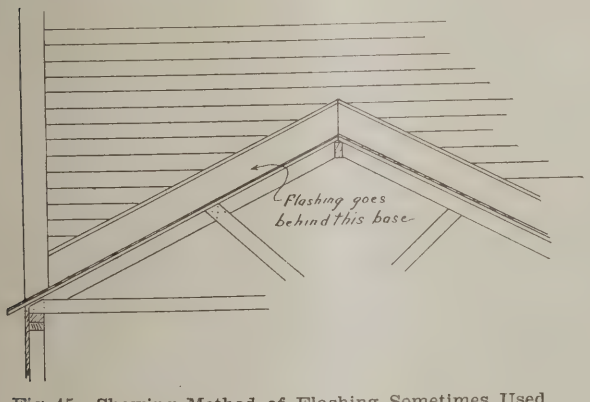


Fig. 45—Showing Method of Flashing Sometimes Used

better method of flashing than the long, single strip of tin often used for this purpose.

A method of flashing a chimney is pictured in Fig. 46. In the drawing, the sheet of tin for the front of the chimney is shown covering a number of short shingles in the course *A*. What may be considered a better method is to omit these short shingles entirely and let the flashing rest on the course below. The end shingles in the course *A* will then stop at the sides of the chimney and the ends of the front flashing will be covered and held down by them.

The side flashing is worked into each course in the same manner as described for the dormer, the upper end of the flashing being embedded in the joints of the brickwork for about 1 inch. The mortar is raked from the joints to permit of this being done, and the flashing, after being turned into place, is held with a nail or a small plug of wood. After the flashing is all finished the joints are again filled with mortar. The piece of flashing for the back of the chimney should be long enough to extend up the roof under four courses of shingles.

Sheet lead will make a much neater and better flashing than tin, but on account of the extra cost is seldom used. A compromise between the two methods is to use sheet lead for the corners only.

Circular towers with conical roofs are not used as much on the modern residence as they were for-

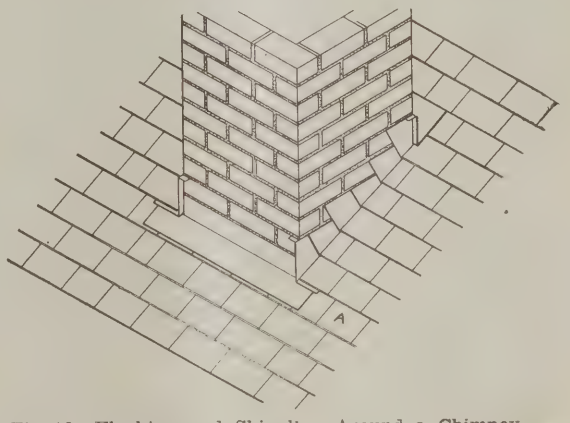


Fig. 46—Flashing and Shingling Around a Chimney

merly, but there is no telling how soon they may be again in favor and there is a little item in connection with them it may be well to mention. The roofs of these towers were after decorated with several rows of ornamental dimension shingles. In nearly every case the fellow who figured the job overlooked the fact that on a conical roof each course of shingles is smaller than the one below it, and that if ornamental shingles are used, each separate shingle will need trimming to size.

Another thing that puzzled some of the shinglers was how to strike a line for the courses of shingles. The answer, of course, is, fasten one end of a string to the apex of the roof and tie a pencil to the other end. This will strike a horizontal line around the roof surface, the height of which can be varied by shortening or lengthening the string.

(To be continued)

*A sheet of tin is 20 x 28 inches and the tin shingle, though called 7 x 7, is usually 6⅔ x 7 inches, so as to cut the sheet without waste.

A MODERN HOUSE OF HOPI ARCHITECTURE

When the first Spaniards explored what is now California and the surrounding States, they found a style of architecture among the Indians which has seldom been equaled for adaptability to en-

vironment. The sole idea of the builders was to erect dwellings which should so blend in with the surroundings that, even to the keen eye of a hostile Indian, they would be barely distinguishable from the encircling buttes.

Modern ingenuity has taken this old style of architecture and selected a type which, although common to many tribes of Indians, yet presents features saliently Hopi, and patterned after it a dwelling in La Jolla, a small town about ten miles from the city of San Diego, Cal.

The house is built against a bluff which towers, tier on tier, back into the distance, while in the front, the sparkling blue of the Pacific Ocean lends a beautiful tone to the view.

Keeping this environment in mind, a house was designed to be built of stucco in the shades of tan which would match the sands of the bluffs. An original note, not found in the prototype, was introduced in the deep shade of blue which seems to have been stolen bodily from the pallate of the ocean to tint the doors and window casings. This same color scheme of tan and blue is carried out in the interior decoration so that nowhere might the hand of man sound a discord in the suggested color scheme of Nature.

Huge beams, hand hewn from telegraph poles, form the floor levels and project beyond the walls.

The house is approached by means of a narrow irregular flight of stairs which takes full advantage of the inequalities of the ground so that they might appear impromptu and inconspicuous. Entrance is had high up, almost to the roof, leading into a small hall containing a dressing room on one side and a staircase leading down to two bedrooms, a bathroom and a sleeping porch, which constitute the first floor plan. There is also a separate first floor entrance. The upper hall also leads, by way of two steps down, to a large living room done in plaster and with a front composed entirely of glass windows opening upon a balcony or terrace. Back of the living room is a small kitchen with a tiny bedroom adjoining it. Interior decorations are of Hopi design and various knicknacks of the same tribe lend their picturesque aid to give local color.

The flat roof, so characteristic of this type of architecture, is reached by means of a Hopi Indian ladder, which has one side much longer than the other. A more convenient and equally picturesque ascent can be made by means of a flight of broad steps that go up outside of the house on the opposite side to the regular entrance. A square chimney, huge enough to throw a protecting shade, affords shelter from a too warm sun. The house is intended to perpetuate some of the traditions and architecture of the Hopi Indians who inhabited the deserts of Arizona.

Atlanta, Ga., recently passed an ordinance prohibiting the use of wooden shingle roofs in that city after the first of January, 1917. The repair of more than 50 per cent of a roof area with wooden shingles is also prohibited after that date.

CHANGE OF "BUILDING AGE" ADDRESS

We desire to announce to our readers and patrons that with this issue, THE BUILDING AGE, founded under the name of *Carpentry and Building* by David Williams in January, 1879, passes to the control of the American Architect, Inc., with offices at 50 Union Square (Fourth Avenue and Seventeenth Street), New York City. Plans looking to this change have been under consideration for some time past and were completed on Sept. 1. THE BUILDING AGE, however, will continue as a separate publication devoted to the same field as heretofore. There will be no material change in the editorial policy which for thirty-eight years has maintained THE BUILDING AGE upon a high standard of excellence for those practically engaged in moderate cost construction work, but various modifications will be made in the typographical features, some of which will be noticed in the current number of the paper.

SUGGESTIONS FOR INTERIOR AND EXTERIOR TREATMENT

We continue this month the presentation of the series of excellent pictures which afford suggestions for the treatment of entrance doorways and interiors of modern houses of a type calculated to interest the practical builder as well as the young architect. These pictures represent a variety of treatment, the first one showing a quaint design of entrance with the French doors framed in a trellis work for climbing vines and with seats on either side.

There are two interiors of stair halls each of which may also be used as a reception room, and there are also two dining room interiors which sharply contrast in their wall treatment.

The fourth page presents an excellent assortment of designs of modern entrance door hardware, all of which cannot fail to prove of special interest and value to the progressive builder who is ever on the alert for suggestions which he can utilize in a practical way in his business.

THE INVESTING BUILDERS' ASSOCIATION

One of the results of the new Zoning and Height Limiting Restrictions Law with which the builders of New York City, and more especially those concerned with the erection of high-grade apartment houses had much to do, is the organization of what is known as the Investing Builders' Association, with officers for the ensuing year as follows:

President.....J. E. R. Carpenter
1st Vice-President.....Alex. M. Bing
2nd Vice-President.....Edgar A. Levy
Secretary.....David Tischman

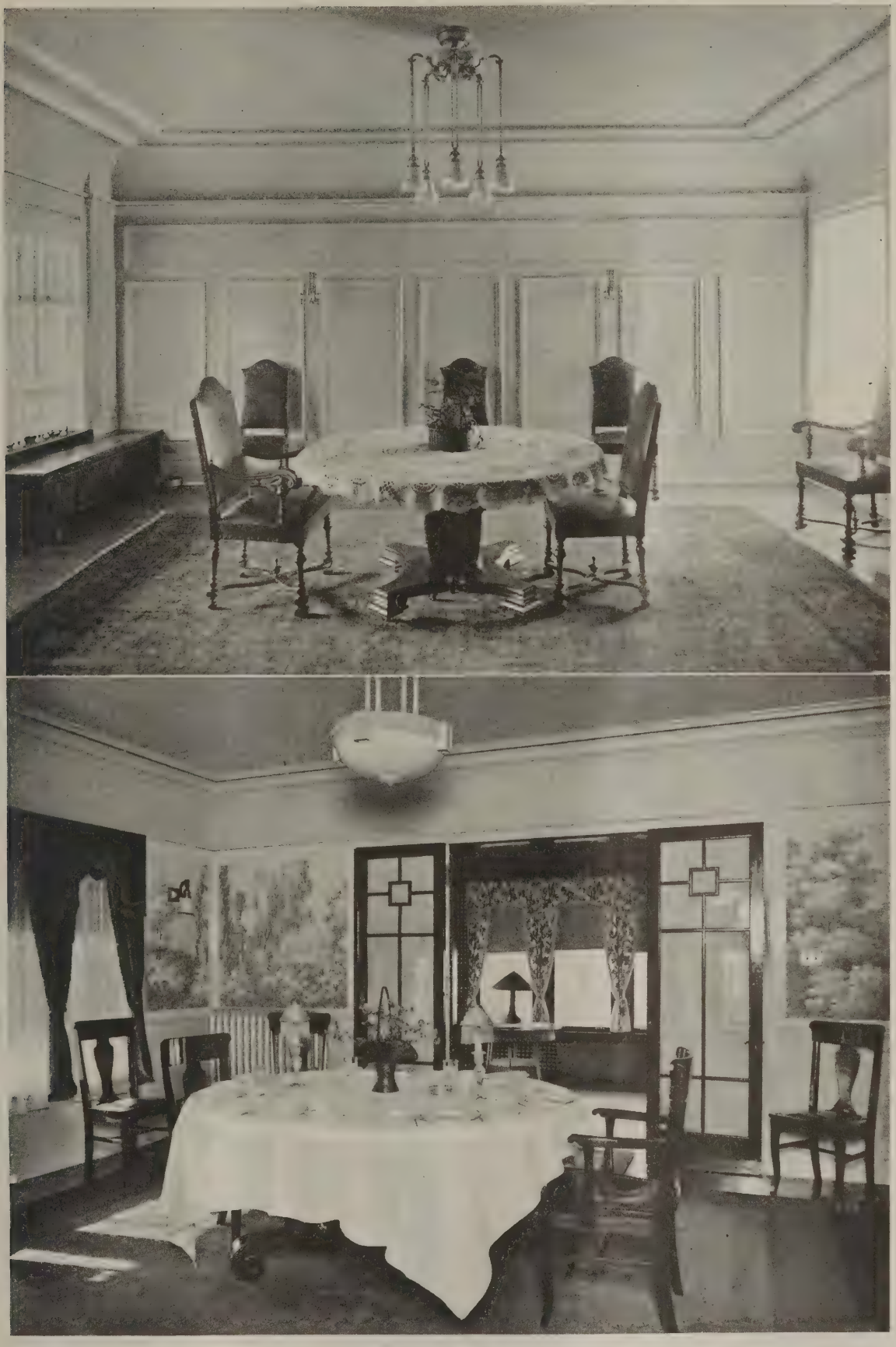
The purpose of the organization, among other things, is to treat as a unit with sub-contractors and to look after labor-law matters and such legislation as may prove oppressive and unwarranted.



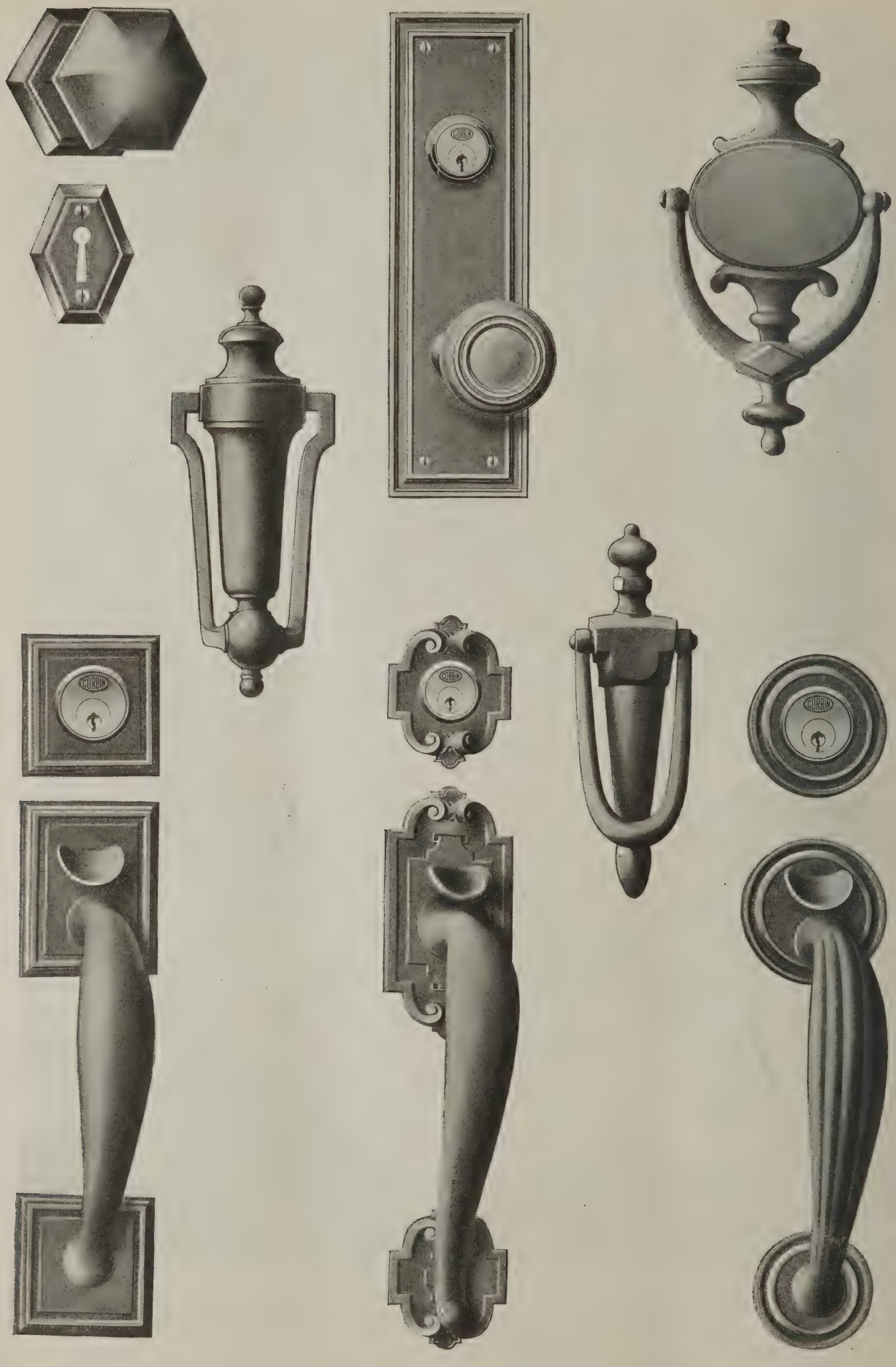
AN ENTRANCE WITH FRENCH DOORS
SUGGESTIONS FOR INTERIOR AND EXTERIOR TREATMENT



TWO STAIR HALLS
SUGGESTIONS FOR INTERIOR AND EXTERIOR TREATMENT



TWO DINING ROOM INTERIORS
SUGGESTIONS FOR INTERIOR AND EXTERIOR TREATMENT



SUGGESTIONS FOR INTERIOR AND EXTERIOR TREATMENT—VARIOUS DESIGNS OF MODERN DOOR HARDWARE—PHOTOGRAPHS COURTESY OF P. AND F. CORBIN

EFFICIENCY IN MODERN HOUSE PAINTING

SURFACES TO BE PAINTED MUST BE CAREFULLY CONSIDERED—TWO GENERAL CLASSES—OLD SURFACES

AT some time or another most of us have kidded carpenter friends about being "wood-butchers," but now along comes a man who calls himself a "Paint Doctor." Odd, isn't it?

But there is at least an interesting likeness between the physician and the painter. The former must study his patient, learn what is wrong, prescribe and treat him. And the painter, to succeed in all of his work, must consider carefully the surface he is to paint and analyze the conditions under which he is to work.

THINGS TO DO BEFORE PAINTING A BUILDING

When called upon to paint a building this Paint Doctor thinks it is an advantage to examine it and find out the kind of lumber or paint used, says a writer in the *Carter Times*. If the old paint went wrong, he tries to find the cause, so as to guard against its occurring again. When the paint has scaled, he wants to know why. Was the fault in the paint or the wood? With a case of blistering, was wet lumber responsible, a leaky gutter, a careless painter or moisture from other sources? Was the wood primed with yellow ochre, which absorbs moisture and doesn't dry, or else throws off the finishing coats?

To get the most value out of a paint investment involves quite a comprehensive knowledge of materials, conditions and men. It means finding out the one best way to paint each house, and that amounts to the much talked of "efficiency" of to-day. No two surfaces are exactly alike, but on new work they may be conveniently divided into two general classes: In the first are dry, porous soft woods, such as white pine, poplar, white wood, cotton wood, etc. The second class consists of such lumber as presents a hard surface well filled with sap, which makes it difficult for paint to anchor itself in the pores sufficiently to avoid scaling, such as pitch pine, cypress, redwood and red cedar.

THE WHITE PINE CLASS OF SURFACES

With the white pine class of surfaces it is desirable to get as much oil as possible into the wood and paint. The amount and the quality of the linseed oil used determine the length of satisfactory service rendered by the paint. On new lumber at least three fairly thin coats ought to be applied. To use but two requires that the paint be mixed thick to cover well, and thick paint does not carry sufficient oil to satisfy the lumber and bind the pigment to the surface as well. Too few coats, which means too little oil, on this kind of surface result in premature and rapid wearing off of the paint. In the case of gray or slate colors produced with lamp black spotting, or fading in spots, also results. Thin coats are better than thick because they carry more oil, dry better and brush out more uniformly.

The pitch pine class of lumber is used to-day on most new buildings. It is not more difficult to handle, but requires different treatment. The priming coat should contain less oil and more turpentine. Probably two-thirds oil and one-third turpentine will be found best on an average and will give a surface that does not possess too high a gloss to take the second coat well. It should dry with a semi-flat or eggshell gloss surface.

THE PITCH PINE CLASS OF SURFACES

For the pitch pine class of lumber tests made under the direction of the New Jersey Master Painters' Association showed excellent results from the use of a priming coat mixed in the proportion of 34 lb. of Carter pure white lead, 66 lb. Carter dry red lead, 6 gal. raw linseed oil, 1 gal. turpentine and 1 qt. of japan drier. Finishing coats are of pure white lead mixed in the usual way. This requires a three-coat job, but it is cheap insurance against scaling paint, and three coats will usually wear enough longer than two to offset the little additional expense. When white lead is used with a primer on the pitch pine class of lumber the addition of one-half pint of benzole (solvent naphtha 160 deg.) to the gallon of paint, mixed as usual, will assist the paint to penetrate the pores of the wood more deeply and gain a better anchorage. Add the benzole to the priming coat only immediately before brushing it on. It evaporates rapidly.

OLD SURFACES

Old surfaces to be repainted may likewise be divided into two classes for convenience, and here again the painter, like the doctor, must analyze. He must look carefully to see what is needed before he can intelligently prescribe the treatment.

One kind of surface is that which has always been painted with pure white lead and pure linseed oil, and simply has become discolored from smoke and dust. The oil has worn out pretty well, and after dusting off the building is ready for repainting with no additional trouble or expense. The old paint will soak up oil from the new and thus renew its binder and anchorage in the pores of the wood. Usually two coats of paint, mixed fairly thin and yet sufficiently heavy to cover well make a nice job under these conditions.

The other kind of an old surface to be repainted is the one upon which hard, inelastic paint has been used. Then even if the old paint is not cracked and scaled, it is usually too hard to be penetrated by the oil of the new coat and consequently the new coat of paint merely lies on the surface and must depend upon the old paint for its anchorage; it can not anchor itself in the pores of the wood.

FALLING LINE SYSTEM OF HANDRAILING

A PROBLEM WHICH WILL BE FOUND OF SPECIAL INTEREST TO BUILDERS AND HANDRAILERS—AN EXPERT'S OPINION

By Morris Williams

THE problem here presented demonstrates the method of constructing a wreath rail over a side sweeping curve containing six winders at the bottom of a stairway, the wreath to have an easement meeting the newel post at a height of 3½ in. above the nosing of the steps plus the length of the balusters.

It was shown in a previous article in these columns how the limitations of the Tangent System, owing to the tangents being the controlling factors, precluded the possibility of constructing a wreath that would be serviceable, and in no ways satisfactory. The best that could be done, as there shown, was to construct it in two sections.

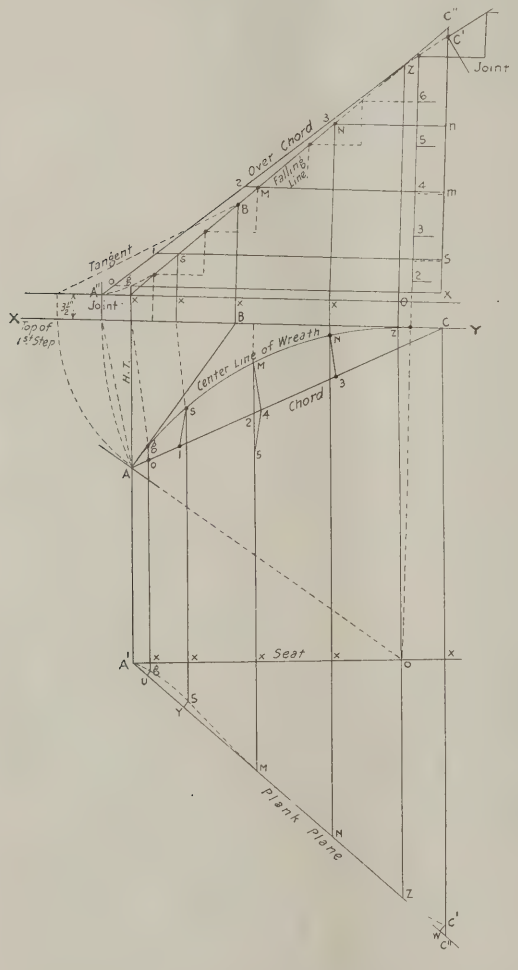


Fig. 1—Elevation of the Steps, the Falling Line and Its Projection to the Plank Plane

In regard to the Falling Line System, as will be shown in the accompanying diagrams, it is not out of place to state that it is a system without limitations and beyond all restrictions. As such it is specifically adapted for constructing a wreath conditioned as the one under consideration, and that because in this system the falling line is the controlling factor.

Referring to Fig. 1 of the diagrams, it is shown in the elevation to follow the nosing with an easement at the top *C′* to agree with the pitch of the straight rail, and another easement at the bottom *A″*, 3½ in. above the nosing of the first step, according to the conditions stated. The method of procedure is to fix upon any number of points contained in the falling line, as shown at *g-S-M-N-Z-C′*; then project them to the plan center line of the wreath and therefrom to the plank plane, as shown by similar reference letters. These points are thereafter projected from the plank pitch to the face mold, as shown in Fig. 2, and finally become the controlling factors in the process of twisting the wreath, as shown in Figs. 5 and 6. The wreath when finished along this process cannot fail to be in agreement with the falling line originally fixed upon, as shown in Fig. 1.

Reverting to this latter figure it shows how the points referred to are projected from the falling line to the plank plane. From each one drop a line to the base line *X-Y*, and therefrom project them to the center line of the wreath as shown at *g-S-M-N-Z*.

Before proceeding further it will be necessary to fix upon a plank plane that will be the best in regard to the thickness of plank for the wreath. Through the points *N-M-S-g* upon the falling line draw lines across as shown to *n-m-S*. Continue these lines to the left so as to cut the overchord line as shown at 3-2-1-0, and transfer the length of each to the plan chord as shown from *C* to 3; from *C* to 2; from *C* to 1, and from *C* to *O*, connecting the points on the chord line with those on the center line of the rail, as 3-*N*, 2-*M*, 1-*S*, etc.

From *M* draw a line to 4, parallel with and equal

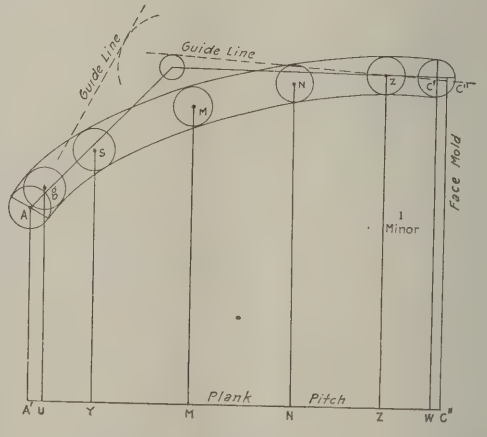


Fig. 2—Method of Laying Out the Face Mold

in length to the line *N*-3, and from 4 to 5 a line parallel with and equal to the line *S*-1.

By connecting *M*-5 a directing line is obtained that will produce the best pitched plane to secure the least thickness of plank for the wreath. It is the plan directing ordinate of the plane.

Now draw lines parallel to it from each point on the center line. The one from *A* will be the horizontal trace of the plane.

Draw the seat square to these lines through the center *O*. Measure from the seat as shown from *X* to *G*-*X* to *S*-*X* to *M*, etc., distances equal to those in the elevation shown from *X* to *g*--*X* to *S*-*X* to *M*, etc., and through the points 8-*S*-*M*-*N*-*Z*-*C*′ trace the dotted curved line all along as shown from *A* to *C*′. This will be the projection of the falling line upon the plank plane, the pitch of the plane being the straight line from *A*′ to *C*″.

Reproduce this line as shown at the base of Fig. 2 and proceed as follows to lay out the face mold: From each point draw perpendicular lines and place upon them dimensions corresponding to those shown from the seat to the center line of the wreath in Fig. 1. For instance, make *A*′*A* equal to *A*′*A*, also make *u*-*g* equal to *x*-*g*. Make *Y*-*S* equal to *x*-*S*. Make *M*-*M* equal to *x*-*M*, etc., shown in Fig. 1. Draw the circles in Fig. 2 as shown to correspond with those in Fig. 5, where it is clearly indicated how each one has been determined. Bend a lath touching each one to obtain the face mold form. Make the joints at *A* and *C*′ square to the guide line.

To twist the wreath a bevel is found for each section indicated by the circles. Just how they are found is shown in Fig. 3, which is a partial reproduction of Fig. 1. Draw a line parallel to the plank pitch from the center *O*, as shown in Fig. 3. Place the radius *O*-*A* of the plan curve in the compass, fix one point in *g* upon the seat line and turn around, cutting the line from *O* in *g*. Draw a line from this point square to the line from *O* and the bevel will be found at *g* as shown.

The bevels *S*-*m*-*n* are similarly found by fixing the compass upon the points *S*-*m*-*n* on the seat line for the bevel required. It is shown later on, in Fig. 5, how these bevels are used to square the wreath at the points indicated on the face mold Fig. 2. The bevels for the joints of the wreath are found by a different method owing to the joints not being square to the face of the plank, the tangents or the straight rails adjoining.

To find the bevel for the bottom joint shown in Fig. 3 on the plan at *A*′ and on the falling line at *S*′ in the same diagram, draw a line from *B*′ parallel with the plan joint *A*′ to cut the horizontal trace in

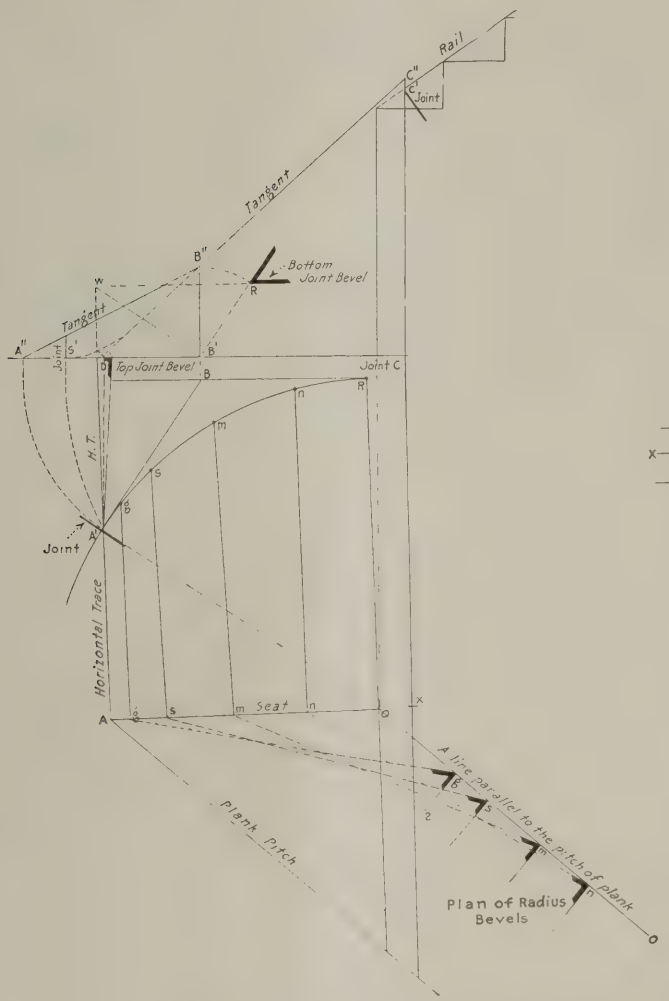


Fig. 3—Showing How to Find the Joint and Section Twisting Bevels

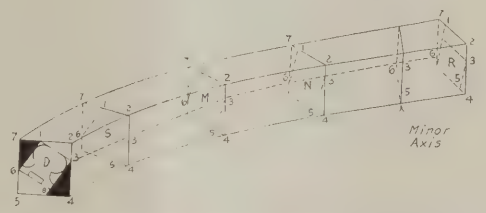


Fig. 6—Showing How to Square the Wreath

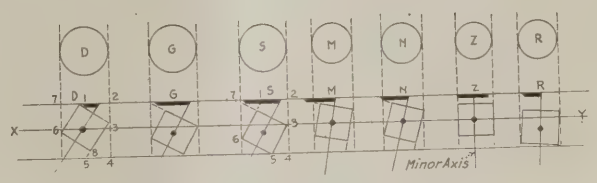


Fig. 5—Showing the Bevels Applied to Determine the Width of the Face Mold at Different Sections

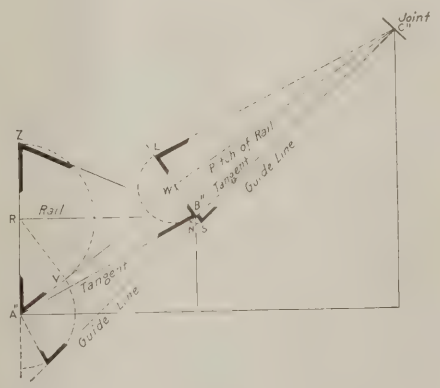


Fig. 4—Finding Bevels for the Easement

W. Draw a square line to it from *B'* to *R* equal in length to *B'B''*. Connect *R* with *W* and the bevel will be found at *R*.

The top joint bevel is shown at *D*, being almost square, having been found according to the same method. Its base is the dotted line *A'D* which is parallel to the plan joint *C*. Its height is a line drawn from *D* parallel to the top joint *C'*, cutting the top tangent continued as shown by the small arc at *D*.

The two bevels are to be applied to the joints in the same manner as the bevels in the tangent system are applied, and for the same and only purpose of twisting the wreath.

The bevels shown in Fig. 4 are for the purpose of butting the wreath joints with the square cut ends of the adjoining rails. Two bevels are found for each joint—one to be applied from the face of the plank downwards, and the other to be applied upon the face of the plank crossways.

To find the bevels for the top joint at *C''* Fig. 4, draw from *C''* the pitch of the tangnent to *B''*. From the same joint draw the pitch of the straight rail to *W*, place in the angle at *B''* the top joint bevel shown at *D* in Fig. 3. From *W* draw a line to *N*. Now turn the line *WN* to *L*, and the line *B''N* to *S* as shown by the arcs. Connect *L* with *C''* and *S* with *C''* for the bevels.

The bevel at *S* will be the guide line for the face of the joint, while the bevel at *L* gives it its downward direction.

To find the same kind of bevels for the bottom joint draw the pitch of the bottom tangent *B''A''*, and from *B''* a level line to *R*. Place at *A''* the bottom joint bevel shown at *R* in Fig. 3 and square to the bevel draw the line *V-R*. Turn this line as shown to *Z* and connect *Z* with *B''* for the bevel shown at *Z*, which gives the bottom joint its downward direction.

Place the compass in *A''*; open out to *V*; turn around as shown by the arc and draw the tangent line to *B''* for the guide line bevel. The guide lines are shown upon the face mold in Fig. 2, indicating the manner in which they are utilized in giving the true direction for the joints crossways by having them square to the guide line instead of to the tangent.

In Fig. 5 we show how the joint bevels and the plan radius bevels of Fig. 3 are utilized to square the wreath. The line *X-Y* is an assumed center line of a plank, on which the bevel for each section of the rail is drawn. The position of each in relation to the center line is determined by the offsets, shown in Fig. 1, from the plank pitch to the projected falling line, thus making the wreath to follow the falling line instead of the center off plank, as in the tangent system. It will be seen that the center of the section shown on the joint bevel *D* is placed upon *X-Y*. The cause for this, shown at *A* in Fig. 1, is that the projected falling line does not deviate from the plank pitch.

The sections drawn upon the bevels *m-n-z* are also similarly placed, due to the same cause. All the remaining sections are shown placed below the line *X-Y* relatively at a distance corresponding to the offsets between the plank pitch and the falling line, shown in Fig. 1.

The perpendicular dotted line touching the corners of each section in Fig. 5 indicate the difference in width along the face mold, as shown by the circles in Fig. 2. The diameter of each is made equal respectively to the space between these lines.

The manner in which the sections are manipulated to square the wreath is clearly indicated in Fig. 6, which illustrates the wreath material that had been sawed to form the face mold and ready for twisting.

The location of the sections in this diagram correspond with the centers of the circles shown on the face mold in Fig. 2. The manner of marking each section for twisting is shown by the figures 7-1-2-3-4-5-6 upon each section. For example, the figures shown on the end section *D* agree with those on the same section in Fig. 5. The figures 1 and 6 indicate points pertaining to the outside of the wreath, while 3 and 5 pertain to the inside, the shaded portions indicating the waste wood or slab to be removed in the squaring of the sides.

After squaring the sides the next step is to square the top by taking off the slab above the points 3 and 1, and the slab below the points 6 and 5 for the bottom. All sections are treated alike.

Because the markings in Fig. 6 all around are on the outside of the material—either on top, bottom or sides—the points may be easily connected by tracing as indicated in the figure by the dotted line connecting points 3 from one end to the other.

Note that by this method of squaring the wreath the sections as noted in Fig. 5 are transferred to the wreath material in Fig. 6 and precisely located so as to agree with the predetermined points upon the falling line shown in Fig. 1.

The center line of plank is not taken into account in this system as it is in the tangent, the controlling factor throughout all the operations being the falling line.

Observe that section *g* has been omitted in Fig. 6, due as indicated in Fig. 1 to its being too close to section *D*.

TO HARDEN AND POLISH SLATE

In order to harden slate there are several solutions in use on the continent of Europe. The slate is carefully analyzed and solution adjusted in conjunction with the latter's chemical properties, as otherwise if too strong the solution may easily act as a corrosive instead of a preservative. After having been treated with the solution the slate is rubbed down with sandstone, whiting, etc., and then with flour of emery, the final high polish being put on with putty powder, rouge and tripoli. Throughout the entire process great care has to be taken to insure cleanliness.

Operations have just been started on the new State Penitentiary about four miles northwest from Joliet, Ill., and to cost about $3,500,000. The architect is W. Carbys Zimmermann, 64 East Van Buren Street, Chicago, Ill.

BUILDING SEGMENTAL BRICK ARCHES

TWO OF THE MOST COMMON TYPES ILLUSTRATED WITH DIRECTIONS FOR LAYING OUT AND BUILDING THEM

By W. H. Hefelfinger



THE subject of arches cannot be covered thoroughly in a short article, so I have taken two of the most common types of arches and explained how to lay out and build them. To make the explanation easy and clear, the technical terms for the different parts of the arch will be discussed first.

Fig. 1 represents a bonded segmental arch showing the different parts and their technical terms.

Rise—The vertical distance between the highest point of intrados and springing line.

Soffit—The under or concave side of the arch.

Intrados—The inner curve of the arch. Some authorities call the intrados the same as soffit, but I think the majority recognize it as just the line.

Extrados—The outer curve of the arch. The outer surface is called the back.

Key—The central brick or stone of an arch.

Skewbacks—The bricks or stones forming the sloping abutments on which the extreme or lowest voussoirs of flat and segmental arches rest.

Springing Line—The line on which the curve of the arch starts.

Span—The width of arch, or distance between jambs.

Jamb—The side of an opening.

Radius—The radius of the curve to which the arch is drawn.

Crown—The highest point of the arch.

Spandrel—That part of the wall over an arch between the extrados of arch, horizontal line through crown, and vertical line through junction of the line of the skewback and the extrados.

Voussoir—The name given to each separate brick in the arch.

Depth of arch—The distance between the extrados and the intrados, measured on a line parallel with radius line, in all arches, except jack arch, where perpendicular distance at center of the arch must be taken.

The segmental arch is the simplest form of arch to build, and also is used the most. It may be built in various ways, but the most common type is the two-ring rowlock, as shown in Fig. 2. You will find this type of arch used in nearly all dwelling houses, especially the cheaper grade. In 9-in. walls the construction is as shown at *B*, Fig. 2—two rings of half brick, with a wooden lintel in the back. This is for a plastered wall on the inside. If the wall is finished brickwork on both sides, then the arch would be built of whole brick.

In 13-in. walls they may be built several different ways, *C* and *D*, Fig. 2, showing two ways of building them. At *C* we have an arch of half brick and 9 in. of wall carried by a wooden lintel. At *D* the arch is built of whole brick, and 4 in. of wall carried by lintel. The object of using wooden lintels on the inside is to give a straight line over opening and provide nailing for the trim.

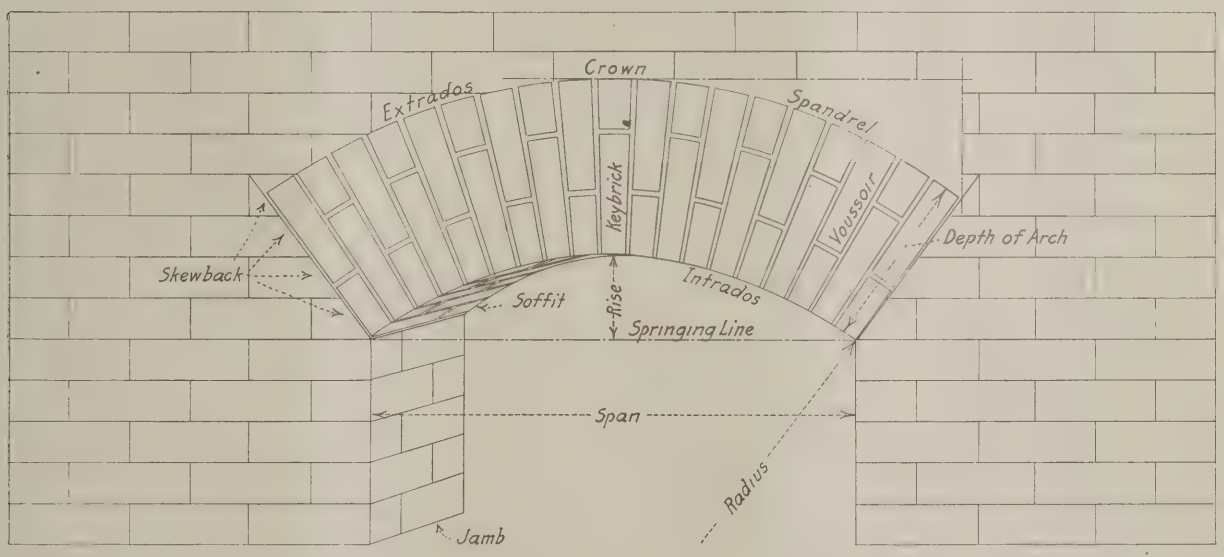


FIG. 1—A SEGMENTAL ARCH WITH NAMES OF THE VARIOUS PARTS OF WHICH IT IS COMPOSED

The first operation in the construction of this arch is to cut the skewback. The segment shown at *A*, Fig. 2, which acts as a center on which to turn the arch, is nearly always cut at the mill, and comes attached to the window frame. The line to which the skewback is cut is always perpendicular to the tangent of the curve of the segment, and is a continuation of the radius of the segment through the point of junction of intrados and jamb. This sounds difficult, but is really very simple. A tangent is a straight line touching circumference of circle, and a radius drawn at this point is always perpendicular to it.

In Fig. 3, *AB* is tangent to curve of segment or intrados, and radius of segment is perpendicular to it; and a continuation of the radius forms line of skewback. If you place a brick on the segment, and hold it so it will rest solid on the segment, the side of the brick against the segment forms a tangent with the segment, and, the brick being square, the side of the brick must be perpendicular to the segment; a line parallel to the side of the brick would also be perpendicular to the segment.

By placing a brick on the segment, as shown at *A*, and one as shown at *B*, Fig. 4, and drawing a line on the brick marked *B* parallel to side of brick marked *A*, you will get proper line to cut brick to form skewback. Take particular notice of the position of brick marked *B*. If you are making ⅜-in. joints, allow space for cross joint about ¼ in. wider than ordinary joint, because when brick is laid up in mortar it will have to go back that extra ¼ in. to keep line of skewback in its proper place. Fig. 6 illustrates this point. After you have the first brick cut and laid the others may be marked by using a rule, as shown in Fig. 5. Be sure and allow extra space for cross joint, so it may keep in line and still have a good cross joint.

After the skewbacks are cut and laid the arch brick may be started. First, cut enough half brick to lay up the arch. Be sure none of them are more than 4 in. long, as they will interfere with the backing up if they are. Lay about four brick with ordinary joint, then measure them; now, by spacing the balance of the segment with this distance, you may readily see how the arch is coming out. By increasing or decreasing the size of the joints a small amount they can be made to come out whole brick. After the first ring is laid the second one may be started. By keeping each brick back a trifle you will gain half of a brick by the time you reach the center, which allows you to get in one more brick in the second ring than in the first. One of the main points in the construction of arches composed of several rings is to see that each ring is keyed out the same. If the bottom ring is too tight it will have to support all the weight; and if the second ring is too tight the bottom ring is liable to drop and leave an open joint.

Cutting over the arch is the next step, and the

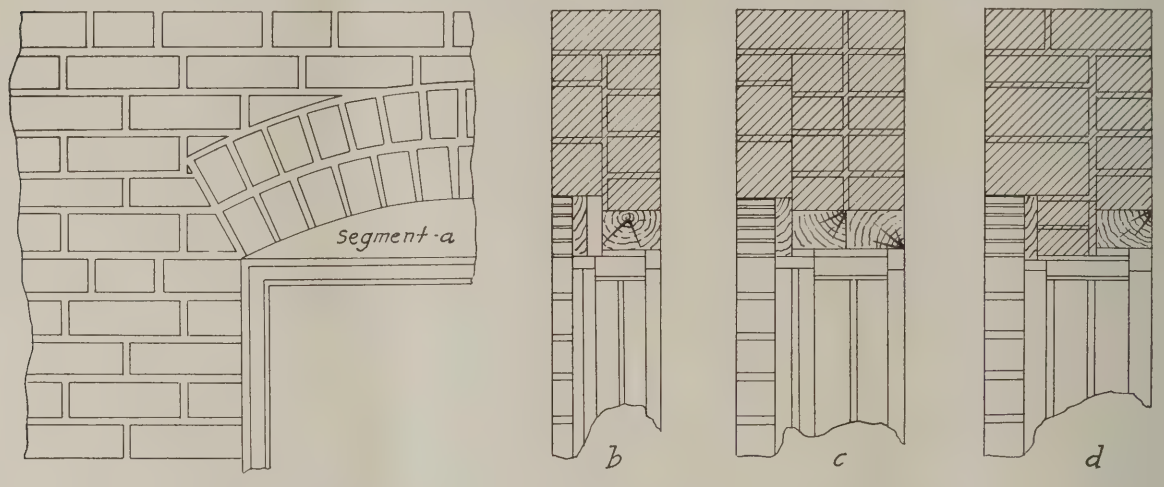


Fig. 2—Partial Elevation and Details of a Two-ring Rowlock Segmental Arch

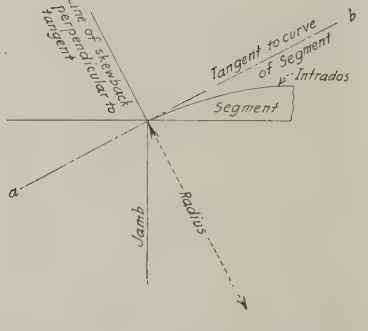


Fig. 3—Diagram Explaining Relation of the Skewback to the Segment of the Arch

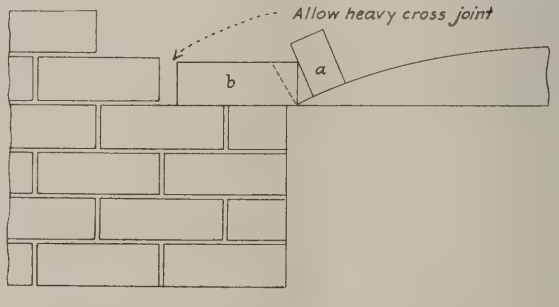


Fig. 4—Showing How to Obtain Proper Line for Cutting the Brick to Form the Skewback

appearance of the arch depends very much on how this is done. The joint over the arch should be of even thickness throughout. The most accurate

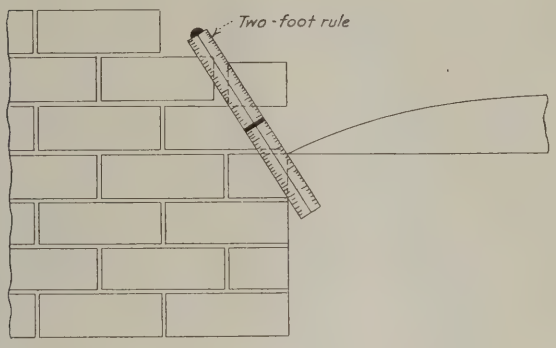


Fig. 5—Showing How to Lay the Rule for Marking the Other Brick

way is to mark each brick, and cut it with a chisel, then lay it; but a large number of bricklayers guess at the size, cut it with a hammer or a trowel, then lay it regardless of the joint. Some brick-

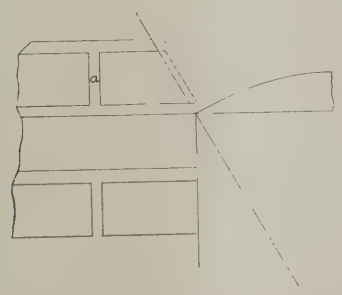


Fig. 6—Dotted Line Shows Where Brick Comes When no Space Is Allowed at "A"

layers are able to do it that way and make a good job of it, but the majority cannot.

To mark a brick, first hold it as shown at *A*, Fig. 7, and mark as dotted line at *O*, which is paral-

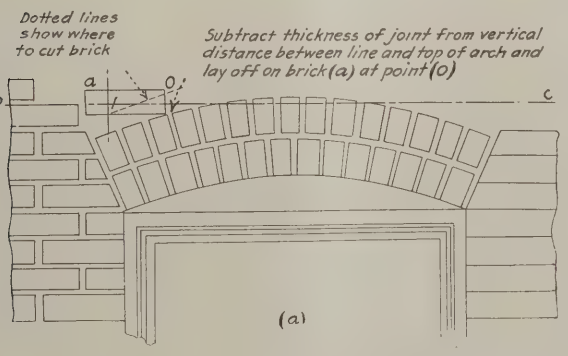


Fig. 7—Showing How to Mark a Brick When Cutting Over the Arch

lel to curve of arch. Brick over any arch may be cut the same way. In laying brick over an arch it is best to keep them a trifle high, so that any settlement in the wall will not cause them to drop and look uneven.

(*To be continued*)

UNUSUAL EXHIBIT AT MINNESOTA STATE FAIR

One of the features of the recent Minnesota State Fair was a miniature model of a suburb consisting of nine homes substantially built of lumber, the principal purpose of the exhibit being to show the possibilities of wood in home construction. Each model was of a different architectural design, ranging from the Dutch and American Colonial and the English thatched roof to an adaptation of the present-day American homes.

Each house had its garage and there were porte-cochères, rustic seats, vine-clad trellis and lattice work, sun dials, birdhouses, winding concrete walks and even tennis courts all placed at the proper relative distances from the homes and from each other.

The model suburb was built under the direction of the Cleveland Board of Lumber Dealers to illustrate the value of lumber in suburban homes, and was first shown at the convention of Ohio Lumber Dealers in Cleveland. The architectural work was done by Howell & Thomas of Columbus, Ohio, and the landscape effects the work of Albert D. Taylor of Cleveland. The exhibit at the State Fair was under the auspices of the White Pine Bureau.

UNIQUE APARTMENT HOUSE IN SAN ANTONIO

An apartment house embodying unique features in plan is about to be erected in San Antonio, Texas. Each of the forty-five apartments which the structure is to contain is so arranged as to have a southern exposure, this being accomplished by constructing the building in the form of an irregular figure "4," each wing being but one apartment deep, and by the extension of corridors on the northern exposure along all the floors.

Each apartment is to have a screened-in sleeping porch, which may, on occasion, be converted into a sun parlor; dressing rooms with built-in wardrobes; brass beds which may be folded back into ventilated closets; steam heat and circulating hot-water systems. Each living room is to have a hardwood floor and hardwood doors, built-in buffet, indirect electric lighting fixtures, base receptacles for portable lights, etc. Plans for the structure, which is to be called "Cerralvo," have been prepared by Architect J. Flood Walker.

The District Commissioners of Washington, D. C., have ordered the building inspectors to secure the names of both the owner and the contractor when application is filed for a building permit. Heretofore permits have been issued to owners without inquiry as to whether or not the contractor was licensed.

Where under surfaces of slabs are to be plastered, says *Concrete*, a scattering of coarse sand or fine gravel on the "forms" will result in a surface insuring a better bond.

A HALF-TIMBERED VENEERED HOUSE

THE LIVING ROOM AND CENTRAL STAIR HALL ARE FEATURES—SOME DETAILS OF CONSTRUCTION



WE have taken for the subject of our colored supplemental plate this month a seven-room house, the first story of which is brick veneer, the second story and gables in half-timbered effect, and the roof covered with asbestos shingles exposed five inches to the weather. The house is intended for a corner lot 50 x 100 ft., or for an inside lot measuring 75 x 100 ft. according to preference.

According to the architect, the foundation walls are to be of concrete, 10 in. thick, resting on concrete footings measuring 22 in. wide and 10 in. deep. If preferred, stone walls 18 in. thick may be used. All concrete is to be mixed in the proportions of one part of Portland cement to three of sand and five of broken stones.

THE EXTERIOR WALLS

The exterior walls, from the ground line to the second tier of beams, are to be veneered with brick, the latter being secured to the framework of the building by means of metal ties placed every fifth course on every other brick. The work is to be done in such a way as to leave a 1-in. air space between the brick veneer and the sheathing, and at the bottom of this air space a 2-in. ventilating drain pipe should be placed.

The exterior of the second story is to be covered with stucco composed of one part Portland cement to three parts of sharp white sand and not more than 10 per cent of lime putty. This coat is to be at least ½ in. thick, and applied under pressure. The finishing coat is to be ¼ in. thick, and to consist of one part of Portland cement to two parts of white sand and three parts of pebbles, for rough finish. The stucco is to be paneled with four inch strips of white pine, as shown on the colored supplemental plate, and also on the elevations which appear on the facing page. The stucco is to be two-coat work of a light cream tint.

THE FRAMING TIMBERS

The framing timbers of the house are to be of spruce. The first and second-floor joists are to be 2 x 10 in., placed 16 in. on centers, the rafters 2 x 6 in.; the second-floor ceiling timbers 2 x 8 in., placed 20 in. on centers, the studs 2 x 4 in., placed 16 in. on centers, the plates and corner posts 4 x 4 in., and the sill 4 x 6 in.

The floors of the rooms in the first story are to be double, with a layer of felt to be placed between the rough and finish floors. North Carolina pine is to be used for the flooring throughout.

The plastering is to be two-coat work, and the living room, dining room and hall are to have a rough finish. All other rooms are to have a hard, smooth finish.

The doors and all trim are to be of cypress. Window and door frames are to be of pine, and the same material is to be used for all sash and outside trim.

THE CHIMNEY

The chimney is to be built of common brick, laid in cement mortar, and all flues to have vitrified flue lining. The chimney, above the roof, is to be finished and capped as shown. The chimney breasts are to be of tapestry brick laid up with wide joint.

An examination of the floor plans shows the living room, at the left of the entrance hall, to be one of the features, extending as it does the entire depth of the house. At the right of the entrance hall is the dining room, having an open fireplace, the same as the living room.

Communication between the dining room and the kitchen is established by means of a commodious pantry, well lighted by a rear window. A door from the pantry gives ready access to the stairs leading to the cellar, as well as to the main flight leading to the second story. Directly under the kitchen, in the cellar, is located the laundry.

On the second floor are four sleeping rooms, each provided with a commodious clothes closet, and all within easy reach of the bathroom. The main flight of stairs is lighted by a large window at the landing, and just at the right of these stairs, on the second floor, is a linen closet, while at the left is the flight leading to the unfinished attic.

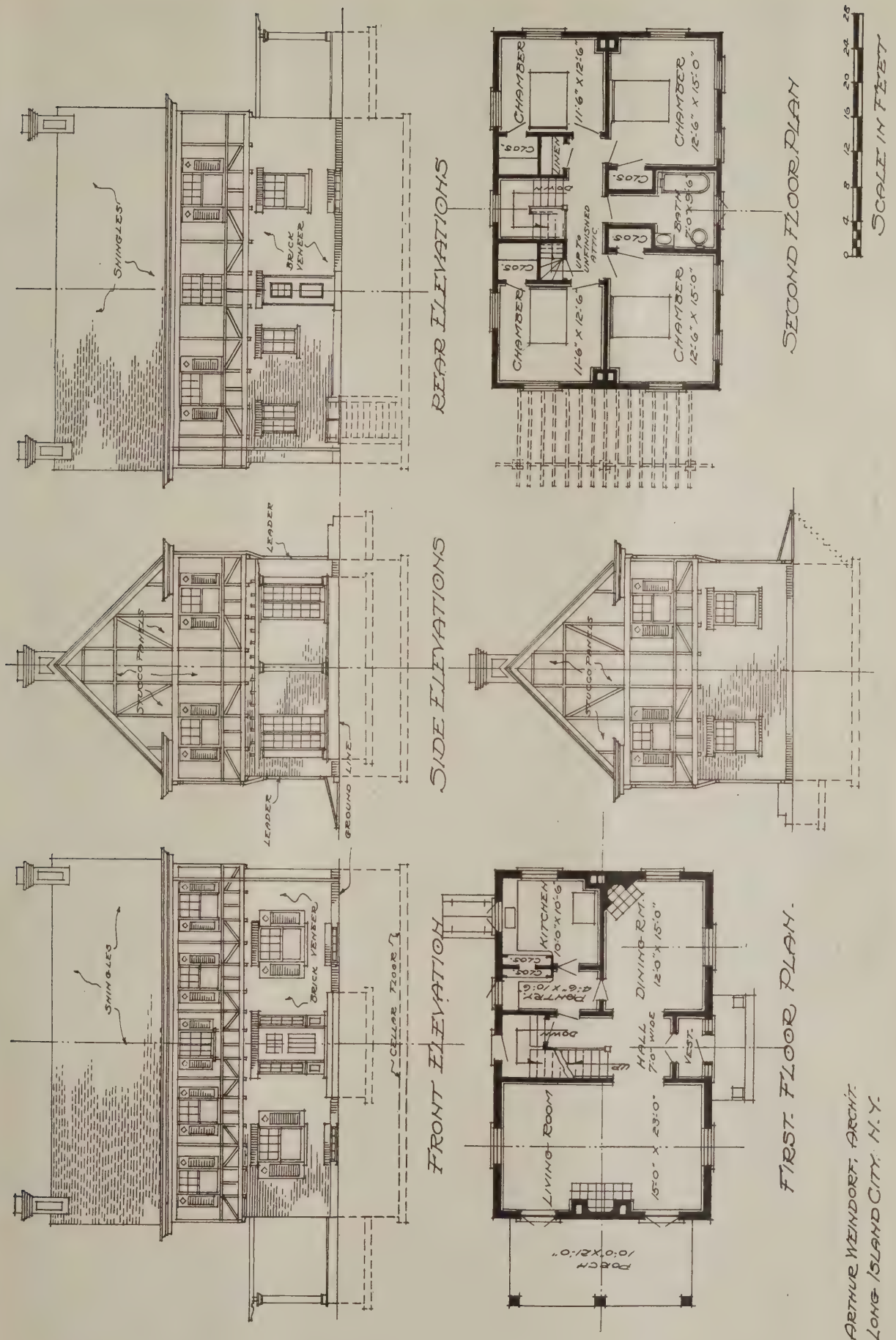
THE BATH ROOM

The bathroom is placed at the front of the house, between the two sleeping rooms. It is to be fitted with porcelain enameled bathtub with hot and cold water connections, wash basin with china bowl and marble top and back, and to be supported on nickel-plated legs. The water closet is to have china bowl, hardwood seat, and high tank with chain and pull. The floor of the bathroom is to be covered with mosaic tile and the side walls are to have a wainscoting 3 ft. 6 in. in height, consisting of 6 x 6-in. white tile. The walls above the tiling are to be given two coats of waterproof paint.

The plumbing in the kitchen is to include iron enameled sink with hot and cold water connections and a 40-gal. galvanized-iron boiler. The range for cooking is to be of the combination coal-and-gas type. The kitchen and pantry walls are to be given two coats of waterproof paint. All exposed pipes in the kitchen, pantry and cellar are also to be painted, while those in the bathroom are to have a nickel-plated finish.

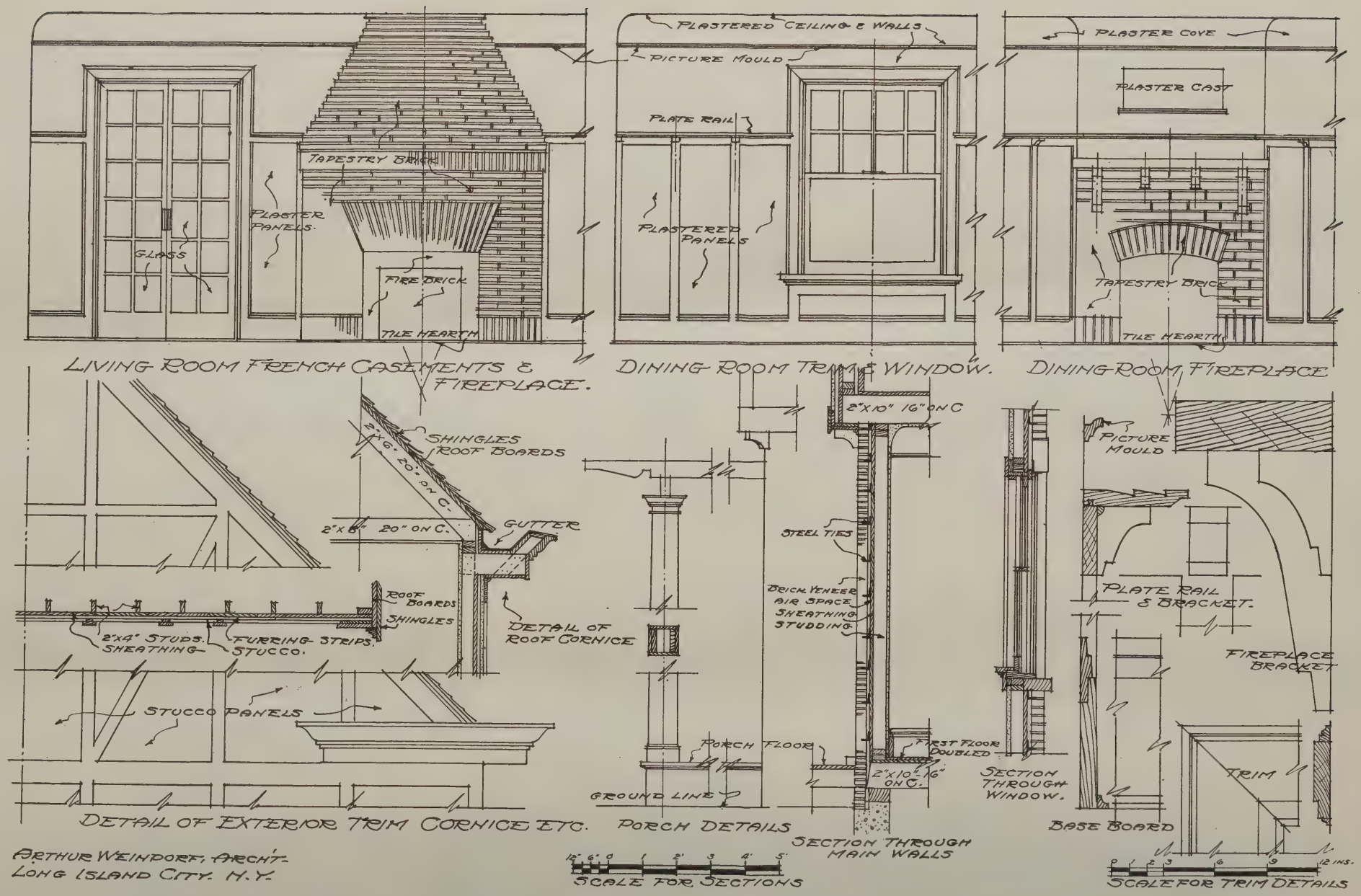


BUILDING AGE
NEW YORK



ARTHUR WEINDORF, ARCHT.
LONG ISLAND CITY, N. Y.

PLANS AND ELEVATIONS OF BRICK VENEERED HOUSE SHOWN ON COLORED SUPPLEMENTAL PLATE



ARTHUR WEINDORF, ARCH'T.
LONG ISLAND CITY. N.Y.

MISCELLANEOUS CONSTRUCTIVE DETAILS OF BRICK VENEERED HOUSE SHOWN ON COLORED SUPPLEMENTAL PLATE

The trim in the living room, the dining room and the hall is to be rubbed down smooth, stained and finished flat. All floors are to be scraped smooth, varnished and waxed. The trim in the kitchen and pantry is to be painted three coats of flat white. All trim in the rooms on the second floor is to be painted three coats of flat white, and the bedroom doors are to be stained mahogany, flat finish.

The glass in all doors and windows is to be double-thick American of the best quality. The hardware throughout is to be of a dull bronze finish and of a standard make.

In the unfinished attic is sufficient space for two good-sized rooms should the owner desire, this being accomplished by cutting dormer windows in the rear of the main roof.

The exterior woodwork is to be given three coats of white lead and linseed oil. The sheet-metal work is to be painted two coats of red lead on both sides.

The house is to be piped for gas, and all rooms are to have outlets for gas fixtures. The rooms are to be provided with electric lights, and each closet is to have a single light. The outlets are to be so arranged that combination gas and electric fixtures can be used.

The building is to be heated by a hot-water system, with radiators located in all rooms and to have a bronze finish. The boiler and radiators are to be of such size as to maintain a temperature of 70 deg. when the thermometer registers zero outside.

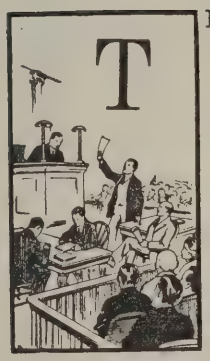
The architect gives the cubical content of the house as 34,683 cu. ft., and a unit price of 19c. per cubic foot. These figures, however, do not include the contractor's 10 per cent profit. He states that by substituting cedar shingles for asbestos, hot-air heating for the hot-water system, and omitting either electricity or gas, a saving of some three hundred dollars may be effected.

The architect of the house here illustrated and described is Arthur Weindorf, Long Island City, New York, or care THE BUILDING AGE, 50 Union Square, New York City.

PERFORMANCE OF BUILDING CONTRACTS

WHO BEARS LOSS UNDER DEFECTIVE PLANS?—HOW DOES DEFECTIVE PERFORMANCE AFFECT THE BUILDER?

By ARTHUR L. H. STREET



THAT the law is uncertain as to whether a contractor can recover for work done in compliance with the governing plans and specifications but destroyed through inherent weakness of the plans as furnished by the owner's architect, is shown by a very recent decision of the Arkansas Supreme Court in the case of Monk & Ritchie v. Pine Bluff Hotel Company.

Plaintiffs built for defendants a six-story hotel building at a contract price of $170,000. Suing for a balance due and for the price of extra work, plaintiffs claimed $3,500 for rebuilding a retaining wall which fell before completion of the building. It appears that the wall fell a second time and that defendant owner caused it to be again constructed, for the cost of which a counterclaim was interposed. The evidence at the trial raised an issue of fact as to whether the contractors built the wall according to the plans and specifications and as to whether the fall was caused by defects in the plan or by faulty construction.

The jury found in favor of the contractors, under instructions by the trial judge to the effect that the contractors were not entitled to recover for rebuilding the wall unless they proved that the wall was constructed according to the plans and with reasonable skill; that the fall was caused by a defective plan, and that the defects were not such that the contractors should have discovered them in the exercise of ordinary diligence.

On appeal, defendant complained that these instructions did not correctly state the law; but the Supreme Court held that they "were as favorable to defendant as it could ask," thus intimating that they may have stated the law too broadly against the contractors.

CONFLICTING AUTHORITIES CITED

The higher court said: "Counsel for defendant rely principally upon two Texas cases, which hold in effect that one who enters into a contract to construct a building without requiring from the other party a guaranty of the sufficiency of the plan and specifications cannot relieve himself of liability for failure to complete the work by reason of defects in such plan and specifications. In other words, that if the contractor follows the plan and specifications, which prove defective and cause the building or the improvement to fall before completion, the loss is upon the contractor and not upon the owner. American Surety Co. v. San Antonio Loan & Trust Co., 98 S. W. 387; Lonergan v. San Antonio Loan & Trust Co., 101 Tex. 63, 104 S. W. 1061, 106 S. W. 876. Those cases sustain the contention of counsel, but they do not appeal to us as being correct, and they are clearly against the weight of authority on that subject. The rule is, we think, clearly laid down as follows:

"'Where the builder performs his work strictly in conformity with plans and specifications, he is not liable for defects in the work that are due to faulty structural re-

quirements contained in such plans and specifications, and may recover under the contract, unless he has warranted that the plans and specifications are correct.' 6 Cyc. 63; MacKnight Flintic Stone Co. v. The Mayor, 160 N. Y. 72, 54 N. E. 661; Bentley v. State, 73 Wis. 416, 41 N. W. 338; Huetter v. Warehouse & Realty Co., 81 Wash. 331, 142 Pac. 675.

"The New York court, speaking through Justice Vann in the case cited above, said:

"'The fault of the defendant's plan should not prevent the plaintiff from recovering payment for good work done and good materials furnished precisely as the defendant required.'"

An independent point involved in the Arkansas case reviewed above was decided against the contractors. It related to the validity of a provision in the contract making the builders liable for $100 for every day of delay in completing the building. The clause was held not to require payment of so excessive damages as to amount to a stipulation for the payment of an unconscionable penalty in view of the facts that the hotel building constructed involved an investment of at least $350,000 and that the delay complained of inolved loss of several hundred monthly in rents, salary of the hotel manager, etc. On this point the court said:

"When we place ourselves in the position of the parties when they made the contract, it is easy to see that they had damages in contemplation which were not easily ascertainable, and that they elected to agree upon the damages in advance. This they had a right to do, and there is no reason why the court should disturb that agreement and arbitrarily say that the contract was one for a penalty."

WHEN LIEN RIGHT IS LOST

In a decision which is instructive on the rights of a contractor to enforce a mechanic's lien on the theory of a substantial performance of his agreement, notwithstanding minor defects, for which allowance may be made to the owner, the Appellate Division of the New York Supreme Court lately held in the case of Witt v. Gilmour that a building contract is not necessarily to be regarded as "substantially performed" merely because defects in performance involve less than 10 per cent of the contract price. In this case plaintiff was denied the right to a lien because it appeared that departure from the specifications concerning a chimney created a fire hazard, that defects in the foundations rendered the wall unstable, and that joists and rafters were set several inches farther apart than required by the contract.

Under these circumstances the court applied a former decision of the Court of Appeals to the effect that a builder has no right to substitute his own judgment for that expressed by the owner in the contract as to kind of materials to be used and the manner of their laying, especially when the strength and durability of the building is affected. "Having departed from the agreement," says the Court of Appeals, "if performance has not been waived by the owner, the law will not allow the contractor to allege that he has made as good a building as the one he engaged to erect. He can demand payment only upon the terms of his contract, and if the conditions on which payment is due have not been performed, then the right to demand it does not exist."

It appears that in the case cited above the defective work was performed by sub-contractors; but the court holds that the general contractor, having assumed the principal contract, is chargeable with their shortcomings, especially where he also assumed to supervise the construction.

FAILURE TO CONSTRUCT A FLOOR ACCORDING TO CONTRACT

The measure of an owner's recoverable damage for failure of the builder to conform to contract specifications in the erection of a building was considered by the Wisconsin Supreme Court in the case of Bucholz v. Riemenschneider, wherein an owner complained of the substitution of a felt or asphalt paper roof instead of the tar and gravel roof contracted for, and complained that a cement floor was not up to specifications.

The court applied the following rule applicable to defective construction in general: If the defect can be remedied without reconstructing a substantial part of the building, or without great sacrifice of work and material already wrought into the building, the reasonable cost of correcting the defect should be allowed against the contractor; otherwise the proper measure of the owner's damage is the diminished value of the building, on the basis of the contract price, by reason of the defect. Removal of a felt or asphalt paper roof and substitution of a tar and gravel roof of the kind called for by the contract being readily accomplished without any reconstruction of the building, the court finds that the cost of the substitution is the proper measure of damages as to this item. But since is appears that the floor in question could not be made to conform to the contract without reconstruction of a substantial portion of the building, it was decided that the owner's damage in this respect is to be computed according to the diminished value of the building resulting from the builder's failure to construct the floor according to contract.

MANUAL TRAINING WORK IN A MICHIGAN SCHOOL

The value and utility of manual training in connection with public-school work is recognized and its various branches are being gradually introduced into the curriculum of numerous schools. A notable example of what boys can do along these lines is shown in the work of the students of the High School at Ishpeming, Mich., for they repair the school buildings for pay, conduct a co-operative school farm for profit, and are about to erect a gymnasium for their school from plans drawn by seniors. All this work is under the direct supervision of the regular school authorities, according to H. W. Foght of the United States Bureau of Education.

High-school students from the manual-training department have been employed to repair the various city school buildings for the past six years. During one summer the students thus earned $3,000. The boys have repaired roofs, laid cement floors, built brick walls, and installed plumbing fixtures.

The reports of building operations thus far the present year, taking the country as a whole, indicate a striking demand for residence construction.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

REMODELING AN OLD DOORWAY

From John Wavrek, Jr., Pennsylvania.—In looking over recent issues of THE BUILDING AGE, I noticed quite a number of engravings of very attractive entrances to residences, and the prominence given to this feature has led me to believe that sketches and a description of the way in which a commonplace entrance was remodeled into one of handsome appearance would be of interest. The remodeling was done at small cost, the owner originating the design and executing it himself during spare time.

In the original entrance, shown in Fig. 1, the wall was of brick, the door frame of white pine, and the door itself of chestnut. The finish of the present doorway, Fig. 2, is chestnut, the frame being veneered. The new design certainly adds materially to the value of the house.

The jambs were treated as shown in the cross-section, Fig. 3, and it should be noted that cement blocks with a rough-stone face were used in the construction of the building. The vertical section, Fig. 4, shows the construction of the cornice, which is built against the bottom of a bay window located directly over the doorway.

Almost any entrance can be similarly transformed by a good mechanic if he studies the requirements of the job to be done and takes care not to make it bizarre or out of place.

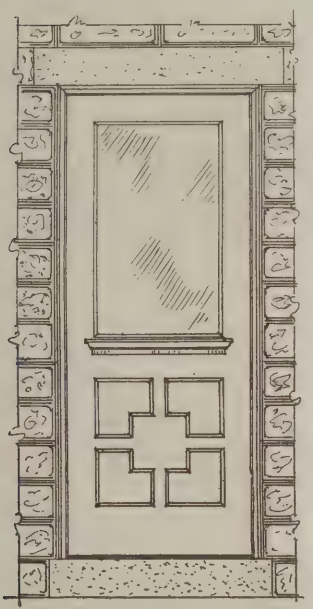


Fig. 1—Elevation of the Original Entrance

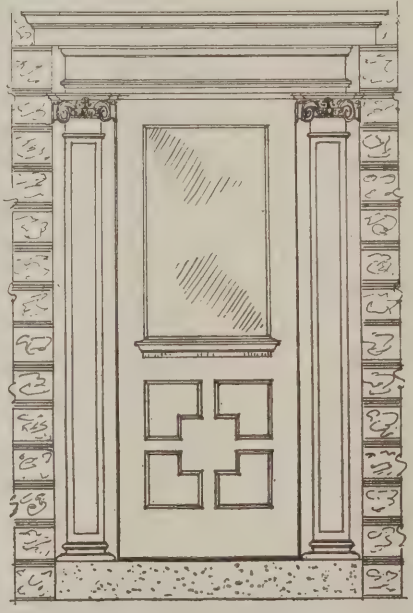


Fig. 2—Appearance of Doorway After it Has Been Remodeled

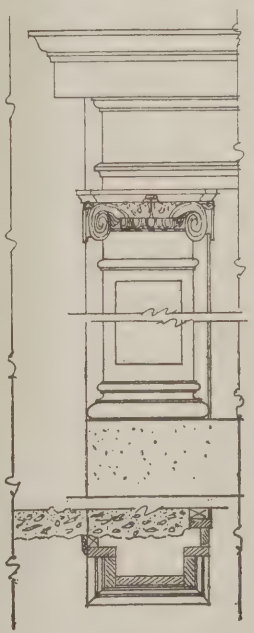


Fig. 3 — Cross-Section and Details of Capitol and Base

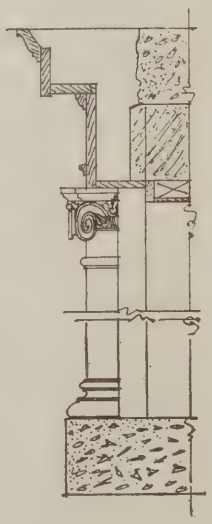


Fig. 4 — Vertical Section Showing Construction of Head

DISCUSSION OF BUILDING METHODS

From D. P. Barry, Clinton County, New York.—I have carefully read what "J. P. W." of Lane, Kan., has to say about sill No. 1, as described by me in the July issue of the paper. The form of sill there presented was intended to show a method of construction widely prevalent in Kansas when I reached the Sunflower State, and when I was about half way through the teens. It was in use when I left as well as before I arrived. I intended it to show cheapness of construction in Kansas. Many houses were built without studs, but with what might be called plates, the boarding running vertical—no plaster or clapboards. Some houses were clapboarded on the studs without sheathing or plaster. When I said "each side," I obviously meant four sides. I was fresh from school when I went to work on that sill, and,

though I did not know much about building, the contractor kept me on until work shut down late in the fall.

I would say that I never saw a rotten sill in Kansas except when set on the ground or on a small stone or piece of wood. The climate here is far wetter than Kansas, and timber sills rot from three causes, namely: setting on the ground after digging one side down to the level, an old custom quite common; second, having no roof over the front doors, the sills of which were cut between the casings and flush with them; and third, leaving banking up year after year. The sills, in these cases, could not dry out. Few houses in Kansas had cellars, and fewer cellars were walled up. The sills might rot in some of these cases, but the statement that sills will rot because doubled up is not in accord with my experience. Might I ask what is the difference in that respect between No. 1 and No. 2? Old buildings called block houses and barns, built in this section, of timbers hewn on four sides, can be seen all about here that have been built nearly a century, and are yet sound where they have been kept out of the ground. In the article in a recent issue, on barn construction, by W. E. Prudden, he shows he is not afraid of doubled plank rotting.

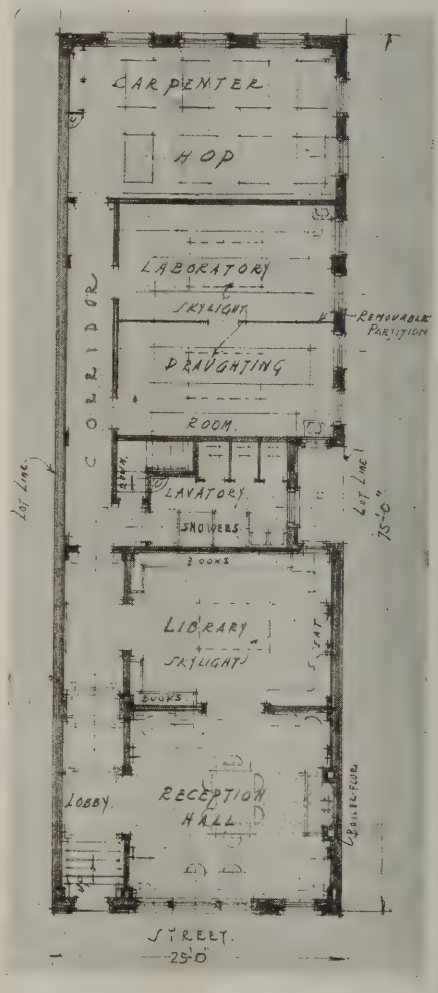
There is nothing to be gained in having the pieces cut between the joists in No. 3, touch the studs. There is nothing to prevent any one from setting them against the studs if he prefers. They are not put in for the purpose of nailing the joists to them. Bridging will not take joists out of wind nor keep them out unless the ends are securely fastened. Studding placed on top of the sills give a rigid construction. If a cyclone takes the superstructure, the floor will be left, at all events.

Now in regard to the door sill. There are similar sills in my own house, which was built some sixty years ago, and they are scarcely marred except those of the woodshed and kitchen doors, which have been trampled on with the heavy cowhide, hobnail boots of those days. Two hours' work will render them good for another century. The style I presented is made of hard wood, and is inconvenient to step on. People always step over the threshold, and the man who puts it in, however young, will not live long enough to ever be called upon to repair it. On page 67 of the September issue a similar sill is illustrated. In that type one must set it with exactness, so that the floor will slip under the lip, and one cannot use flooring of a thickness different from that for which it is set.

Now, a few more words about sawhorses. According to my notion, 2 x 4-in. makes satisfactory horses for sawing long material or other work requiring a pair. However, in clapboarding, where only one is used, 2 x 4 is a nuisance, for as soon as you are ready to square, the board tumbles down; you go to get a measure, and it tumbles again. All work of that character requires a 2 x 6-in. or 2 x 8-in. What is better still, are 3-in. or 4-in.

FLOOR PLANS FOR TECHNICAL CLUB HOUSE

From Charles G. Hehn, Architect, Yonkers, New York.—I am sending herewith a sketch showing a floor plan arranged for a technical clubhouse which may meet the requirements of "S. C. M.," Lake Hopatcong, N. J., whose request appeared on page 56 of the September issue of the paper. He did not state whether or not the lot was on a corner, or how situated as to yards, adjoining buildings, etc. The design which I send will, I trust, prove of interest to the correspondent. The skylights shown will, I think, give sufficient light and ventilation. If, however, there are any points concerning the layout which are not fully understood, I shall be glad to furnish the desired information through the columns of the paper on request.



FLOOR PLAN FOR A TECHNICAL CLUB HOUSE

A QUESTION IN "BATTERED" FRAMING

From C. J. M., St. Johns, N. F.—There appeared in an issue of the paper some time ago a communication from "J. F. M.," Los Angeles, Cal., asking for information regarding the proper cuts at the foot of the posts of a tower the walls of which inclined both ways. When I noticed this question at the time of its appearance I thought it such a

simple matter that it was hardly worth writing about. Since then, however, several very unsatisfactory answers have appeared, and I am, therefore, constrained even at this late date to give the method which I learned for doing such work. Now, as there would be no difficulty in getting any cut on the intermediate posts which stand at right angles to the plane of the sides of the structure, I assume it is with regard to the corner posts that the correspondent requires information.

The question may be generally treated under the head of "battered framing," that is, the framing of structures with walls inclined inward so that they approach each other at the top, thus making the top smaller than the bottom. This is the case with the frames which support water tanks, windmills, bell towers, etc. An elevation of one side of such a structure is shown in Fig. 1 of the sketches, with an outline of the plan in Fig. 2.

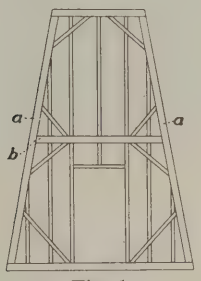
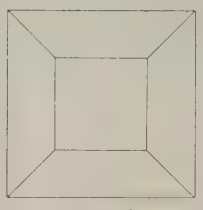


Fig. 1


Fig. 2

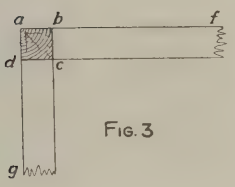


Fig. 3

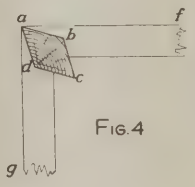


Fig. 4

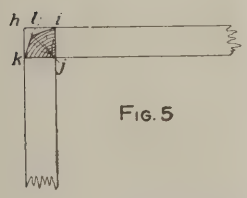


Fig. 5

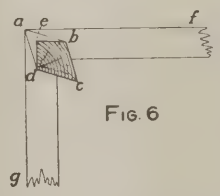


Fig. 6

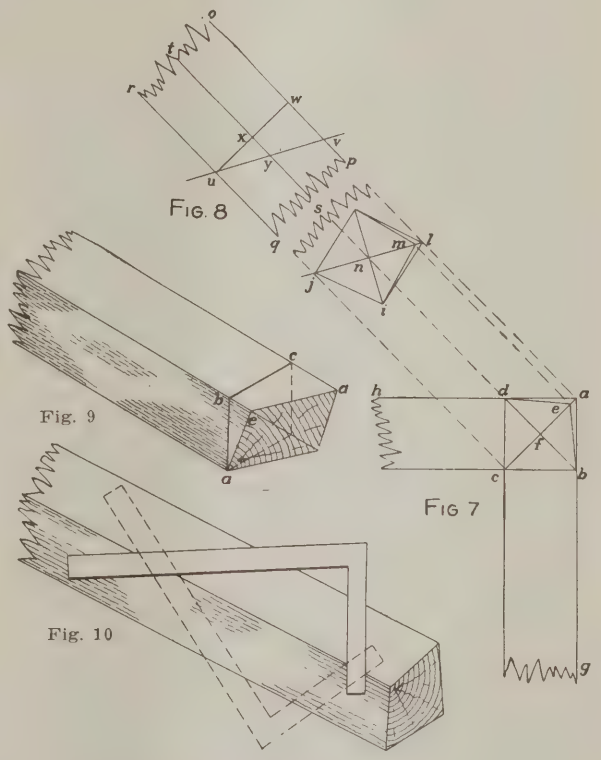


Fig. 8 Fig. 9 Fig. 7 Fig. 10

SOLUTION PRESENTED BY "C. J. M.," ST. JOHNS, NEWFOUNDLAND

It will be seen that the corner posts *a-a* are not perpendicular to the sill at the bottom, but are inclined, and approach each other at the top. This means that the foot of the post must be cut on a bevel where it is tenoned into the sill and the bevel must be cut diagonally across the post from corner to corner, since the post inclines diagonally toward the center and is set so that its outside faces coincide approximately with the planes of the sides of the structure, as indicated in the plan view, Fig. 4. A special cut is also required for the ends of the girts, *b*, of Fig. 1, where they are framed into the posts, which is obtained by taking the angle of the lines *b-c* and *d-c* of Fig. 4 with the face of sill for the top cut and the pitch of post for side cut.

The outside faces of the post, if standing perpendicular to the sill, will coincide with the sides of the sill, as shown by the section *a-b-c-d* in Fig. 3; but after it is cut to the proper bevel to fit against the sill, the section cut out at the foot will be diamond shaped, as shown at *a-b-c-d* of Fig. 4. Here it will be noticed that the faces *a-b* and *a-d* of the post do not coincide with sides of sill *a-* and *a-g*.

It is not necessary that the outside faces of the corner should coincide exactly with the planes of the sides of the structure if it is merely a framework; in this case, posts of square or rectangular section may be used. If, however, the frame is covered in, the posts must be backed so as to receive the boarding. The backing consists in shaping the post so that when the bevel is cut at the foot the section cut out will be similar to that shown at *e-b-c-d* in Fig. 6. The backed post must then be set on the sill so that the point *e* will be at the corner *a*. Then the outside faces of the post, *e-b* and *e-d*, will coincide with the faces of the sill, *a-f* and *a-g*. If the post has a plumb cut at the top, it should be backed before the bevels are cut, because backing them afterward would shorten the distance between bevels. A square post will have, after the backing is done, a peculiar rhombus-shaped section, as at *i-j-k-l* of Fig. 5. Here, *h-i-j-k* shows the original square section which is taken square across the post, perpendicular to its edges.

In Fig. 7 is illustrated the method by which the amount of backing necessary in any particular case may be determined.

If the post were set up perpendicular to the sill, the plan of it would be *a-b-c-d* of Fig. 7. Draw indefinitely the dotted lines, *a-p*, *d-s* and *c-q*, at right angles to the diagonal line, *a-c*, of the plan.

This gives a diagonal elevation of the post. Now, at any convenient place draw the line *j-l*, which should be the diagonal bevel of the foot of the post where it stands on the sill. The center of the line *j-l* is the point *n*, where it cuts the dotted line *d-s*. Through this point, perpendicular to *j-l*, draw *i-k*, making *n-i* and *n-k* equal to *f-b* and *f-d* of the plan. Join *i-j* and *k-l*, which will show a section of the square post when cut to fit the sill. Make *n-m* equal to *n-i* and *n-k;* draw *m-k* and *m-i*, which shows the amount of backing as it appears on the bevel cut. Draw the dotted line *m-e*, cutting the diagonal line *a-c* of the plan in the point *e*. Join *e-d* and *e-b*, then *a-e-d-b* is the amount of backing to be taken from the square timber so that the outside faces of the post will coincide with the planes of the sides of the structure after bevel is cut.

In Fig. 8 is shown the method of obtaining the bevel cut at the bottom of the post to make it fit the level plane of the sill. Having drawn the lines *o-p*, *q-r* and *s-t*, representing the corners of the post, next draw the line *u-v* to represent the plane of the sill. Draw also through the point *u* where *u-v* cuts *q-r*, the line *u-w* at right angles to *q-r*.

Now, taking the section *i-j-k-l* of Fig. 7 for the beveled section of the post, we find that the corner, *l*, is longer than the corner, *j*, by the length of the line *v-w* of Fig. 8, and that the corners *i* and *k* are longer than the corner *j* by the length of line *x-y*.

Therefore, if we square a line around the post, as *a-b-c* of Fig. 9, and lay off *c-d* and *b-e* equal to *w-v* and *x-y* respectively, we have, on connecting *a-e-d*, the bevel of the end of the post taken from the square timber when it is required to be backed.

If the outside faces of the post are backed so they come within the plane of the sides of the structure, the bevel may be easily obtained by the steel square, applying it to the post, as shown in Fig. 10, with the rise on the blade and the run on the tongue, and drawing a line by the tongue.

In a later issue of the paper, "G. F. Smith" gave a somewhat mystifying solution to this problem. He presented a mass of geometrical pedantry about horizontal and vertical planes of projection and talked about trigonometry and tables of sines, tangents, logarithms, etc., which is about as intelligible to the average working carpenter as a Chinaman's laundry check. He also said he had been reading most of the leading building journals for the last twenty years, and that this was the first occurrence of this problem in any of them, and that he heard it discussed as a catch puzzle, etc. If the correspondent in question will kindly turn to page 212 of the June (1909) issue of *Carpentry and Building*—that being the name of the paper at the time—he will find a similar problem discussed; in fact, the very same problem, with a different application. If he will take up the text-books of any of the trade schools, he will find the question of battered framing discussed at length. For my part, I do not believe that the present problem was put forward as a catch puzzle. I think it is a real live question, and ought to be treated in a manner so plain that it will be understood by the average mechanic.

STUDDING SOCKETS FOR CONCRETE WALLS

From W. E. F., Charles City, Iowa.—It is a well-known fact that wooden sills bolted to concrete walls have not always given entire satisfaction, and neither have they been of long life. Very often this condition of things has resulted in the weakening of the building at a very vital point, so much so as to wreck the entire structure. Cast-iron studding sockets can now be obtained which



STUDDING SOCKETS FOR CONCRETE WALLS

may be imbedded in the soft concrete in such a way as to produce a hundred-year post support. The sockets are set every 2 ft. along the walls, or whatever the spacing may be for the building. The studding can then be set into them and spiked in place. Such a connection between the concrete base of the building and the frame walls is everlasting and worth while. The picture which accompanies these comments clearly shows the idea.

TROUBLE WITH GLUED-UP WORK

From J. M. D., Detroit, Mich.—I noticed in one of the recent issues of THE BUILDING AGE that a reader wanted to know the reason why his glued-up work was not straight after he had taken off his clamps. "W. M. D." of Baltimore, Md., gives a pretty good reason in the September number, but he could go a great deal further. He says the boards should be straight from end to end. I do not agree with him there for this reason, he will find after taking off his clamps that sooner or later the ends will open up. I have been in the gluing business a great many years and experience has taught me many things. The best test I have had was when I was in the employ of a concern in Kalamazoo, Mich., gluing tops and backs by the thousand.

The first thing to do is to make sure that the stuff is dry. Next join the stuff with a slight hollow; put on a clamp, pull up, watch carefully to see that every place touches and if so all right, then take a toothing plane and tooth both edges. Now we are ready for the gluing.

I notice that "W. M. D." says to have the glue thin. That is all right for some things, but not for all close grain wood. I always temper the glue for

the kind of wood. The job I had was in connection with work where they carved the tops concave and convex to 3/16 in. thick from ¾-in. stuff to get the swell.

"W. M. D." is all right in regard to putting on the clamps on a bow, etc., but he should have his stuff warm on the edges so as to keep the glue from setting. Be sure to squeeze out all the glue until the work is wood to wood. If he follows this he will never have any trouble with his work.

MITERING A RAKE AND LEVEL MOULDING

From W. M. L., Orange, N. J.—Will some of the practical readers of the paper tell me how to miter a rake with a level molding for an exterior angle, the rake having a fall of 1 in. to each foot of length? It is a fillet molding 2 in. wide for face. I would like to see a diagram, with full explanation.

Note.—Some little time ago the problem was illustrated and described at considerable length, and in a way to be of special value to the readers, but as it is possible our correspondent has no files of THE BUILDING AGE running back several years, we submit the question for the discussion of those readers who may be interested.

PLANS WANTED FOR BAKE OVEN

From H. E. McC., Springfield, Ohio.—I would like some of the readers who have had experience in the building of bake ovens to send to the editor for publication a sketch of one burning coke. I have worked on three, but had no chance to see how the most complicated and important parts of the flues were laid out, as the ovens were patented and the foreman would not allow us to touch them, he doing this part himself.

As I have one to build, I would appreciate any sketches, plans or suggestions along this line.

APPLYING SCAGLIOLA TO CEMENT

From E. M. K., East Dowington, Pa.—I come to the correspondence columns for some information in regard to scagliola. Will it hold on cement and how is it applied and colored? Would it be used the same way as on cement composed of lime, mortar, hair, plaster of Paris? The job is in the chapel of a church in Downington and the work was done in the winter. A lot of creek sand was used and when the forms were taken off the work was very rough on account of the sand.

If some of the readers can help me out I will try and make a better job for the church on my own time for the church needs all the help it can get. As I did a great deal of the work, I feel that it is only right for me to make the job as satisfactory as possible. I understand putting on a plaster wall and am not up on scagliola.

I have been a carpenter for ten years and have read THE BUILDING AGE ever since the time I began to work at my trade.

RUSTIC FOUNTAIN AND WATERING TROUGH

From Observer, Chicago, Ill.—I believe many of your readers will be interested in the novel bubbling fountain and horse trough that was built in Brookfield, Ill., by Conrad Schneider, a contractor and builder of Congress Park, Ill. The structure represents an investment of less than $200, and the different colors in the field stone used in its construction present a very pleasing appearance.

The base of the fountain is 4 ft. 6 in wide and 8 ft. 6 in. long, and above the field stone is a concrete trough nearly 3 ft. long and 8 in. deep. On the far side is a bubbling fountain, beneath which



A RUSTIC FOUNTAIN AND WATERING TROUGH

is a cobblestone step for children. An economical feature is that all waste water from the bubbler flows into the trough under the archway gracing the center of the structure. The fountain is capped with cut stone, and flowers adorn the top, while it has also been piped for gas and wired for electric lighting.

The work is an excellent example of what may be built for a small cost, where slightly defective stones, or seconds, are used; and an ingenious arrangement of the various stones is something which the contractor can point to with pardonable pride.

A NOTABLE HOUSE MOVING OPERATION

A THREE-STORY DWELLING WEIGHING ABOUT 375 TONS SUCCESSFULLY CARRIED DOWN A STEEP HILL

WHAT is said to have been the largest and heaviest wooden house ever moved in the city of San Francisco has just been transferred to a new site, a picture of the operation at one of its stages being presented herewith. The house was 58 x 50 ft. in plan, three stories in height and weighed something like 375 tons.

Although its journey involved a distance of only two city blocks, a part of its route was down the steep hill of Washington Street between Octavia and Gough. Going down the hill a dozen men were employed although for the greater part of its travels the house was accompanied by a crew of only 6 men.

In order to serve as a "brake" in its trip down the hill a "Chinaman" was used—not a native of the Celestial Empire, but a heavy wooden post sunk deep in the ground and to which heavy hawsers were fastened. The work was pushed as rapidly as possible so as to avoid blocking the street cars any longer than was absolutely necessary. The trip down the steep hill was accomplished in a week-end while the entire journey was completed in four weeks, which is said to establish a record for moving houses of a similar size and weight.

The picture which we present was taken especially for THE BUILDING AGE, and affords a good idea of the manner in which the house was supported upon the cribbing of timbers.

When the journey began Foreman T. L. Hunt, who superintended the moving operation for contractor William Haskins, put a tag on every crack in the building so that he might be able to tell exactly how much the structure would be affected by the trip. When the journey was finished a careful inspection of the house showed only four new cracks, and these were of minor importance.



A VIEW OF THE BUILDING AFTER IT HAD BEEN RAISED FROM ITS FOUNDATIONS

The National Paving Brick Manufacturers' Association will hold its annual business meeting Oct. 5, at the Deming Hotel, Terre Haute, Ind.

A COTTAGE OF SHINGLED EXTERIOR

THE MASTER'S ROOM AND BATH ON FIRST FLOOR ARE FEATURES — DETAILS OF CONSTRUCTION

THE cottage here illustrated is a combination of brick, stucco and shingles, with large overhanging roof. The low, broad proportions, simple roof lines, the attractive grouping of the windows and the wide veranda extending entirely across the front of the building, all make for a most pleasing exterior. The open arrangement of the library, living room and dining room with their large windows gives an effect of spaciousness which is unusual. The library is fitted with book cases and window seats, and the French doors between the two rooms add to the effect while affording greater privacy when such is deisred.

The living room with its open fireplace of brick and its tile hearth together with the window seats on each side tend to produce a cozy, comfortable and homelike interior. A feature of the dining room is the built-in buffet and window seat. The wide hall extending from the library to the stairway connects on the left with the master's bedroom and a commodious tiled bathroom and on the right with the dining room and kitchen.

A feature of the first floor hall is a large linen closet so placed as to be readily accessible.

The kitchen is well arranged, having every modern convenience including gas range, dresser, pot closet and flour and meal bins. The broom closet is an added feature which appeals to the thrifty housekeeper.

The water boiler in the kitchen is connected to a gas water heater and also with a Berkshire heater attached to steam piping so that water can be supplied by the heating plant when in operation, thus creating an economical system of hot water supply.

On the second floor are three large bedrooms and bathroom, together with maids' room, each opening into the central hall. All bedrooms have large clothes closets and there is a large space which can be used for storage purposes as shown on the floor plan. The space under the roof above the second



SHINGLED COTTAGE OF E. W. BILL AT HAWORTH, N. J.—ARCHITECT, J. L. THEO. TILLACK, NEW YORK CITY

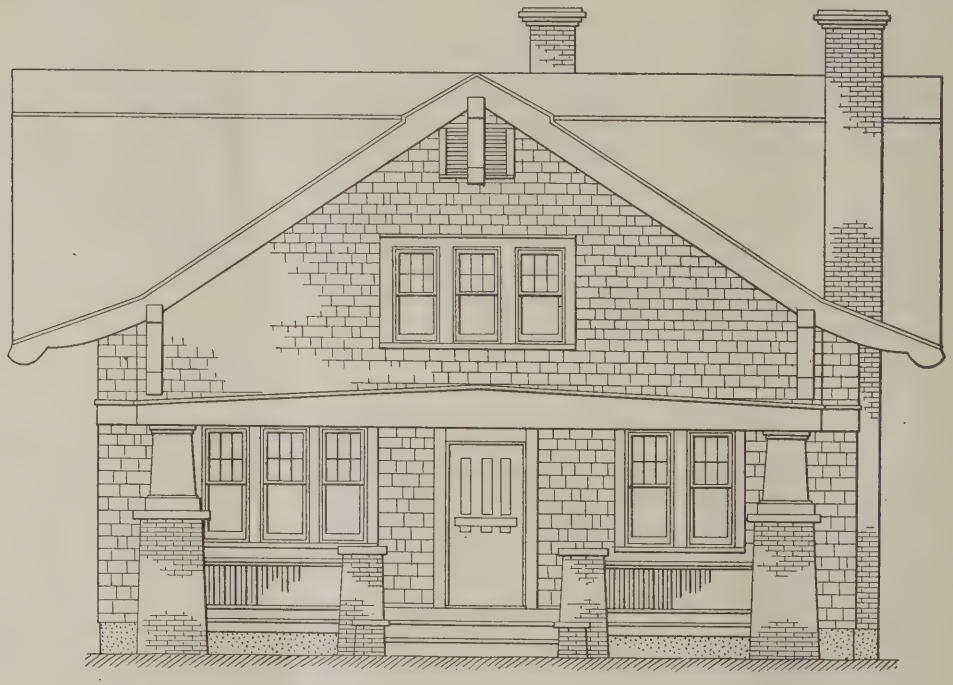
floor bathroom is ventilated with louvres in each gable end.

The cellar which extends under the entire house is well lighted and contains the laundry, extra toilet, coal bins and steam heating plant.

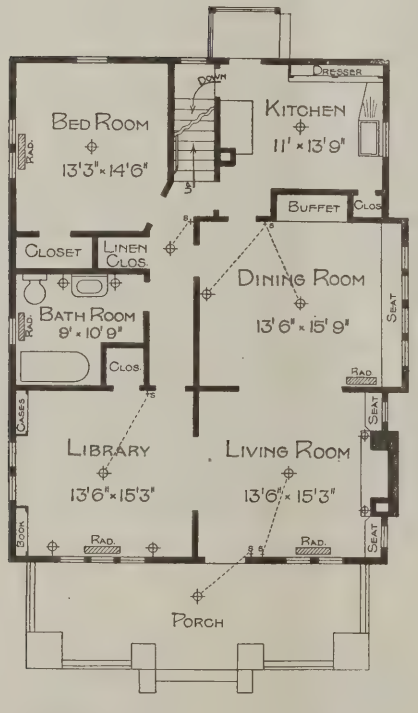
The foundation walls of the cottage are of concrete mixed in the proportions of one part Portland cement to two parts clean, sharp sand and four parts gravel. The cellar floor is of concrete, 3 in. thick, mixed in the above proportions, with a top dressing about 1 in. thick consisting of one part cement and two parts sand. The floor is graded to a drain under the floor consisting of a dry well filled with loose stones. The soil in the section where the cottage was erected is sandy, thus allowing the water to readily seep through.

The outside of the foundation walls below grade were painted with two coats of Barrel's waterproofing paint.

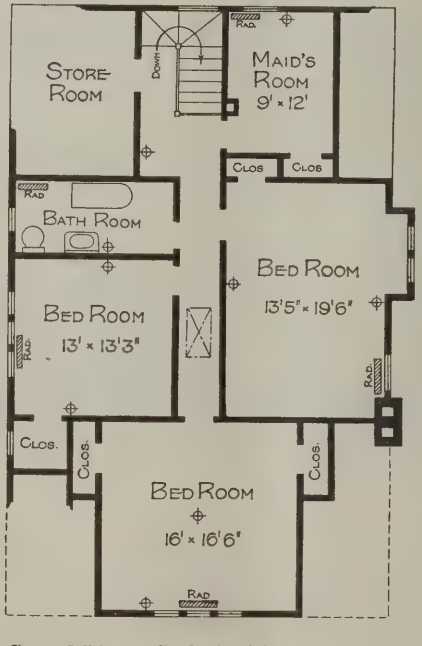
The exterior chimney is built of Hackensack hard-burned brick and faced with light colored wash brick selected from outside the kiln. The same kind



Front Elevation—Scale ⅛ In. to the Foot



First Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

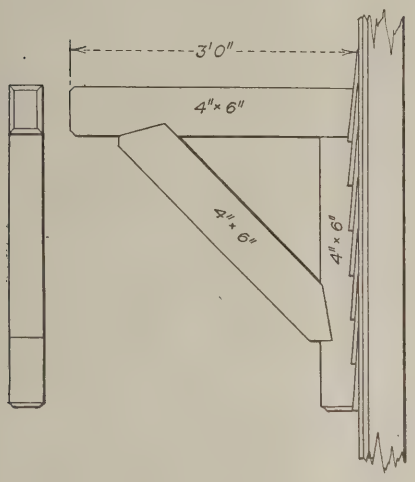
of brick was also used with good effect in connection with the porch columns.

The chimney, as will be noted from the detail presented elsewhere, takes care of the living-room fireplace. An ash dump in the hearth carries the ashes into an ash pit which is provided with iron

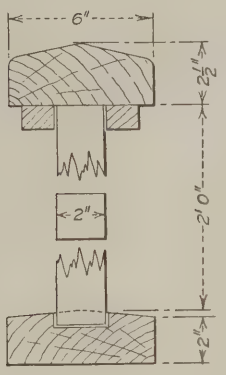
coat work with sand finish, thus giving an ideal surface for tinting.

The bathroom on the main story has tiled floor and side walls, the tile floor having a concrete base laid on centering between floor beams.

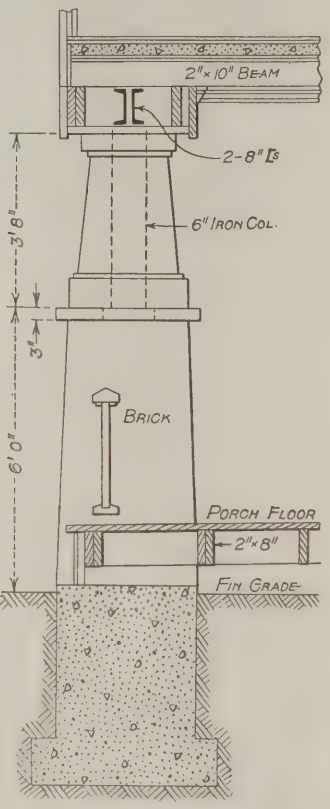
All areaways around the cellar windows have



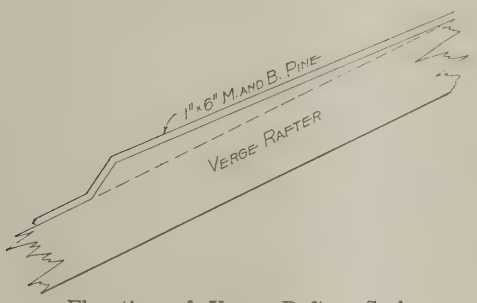
Detail of Bracket—Scale ½ In. to the Foot



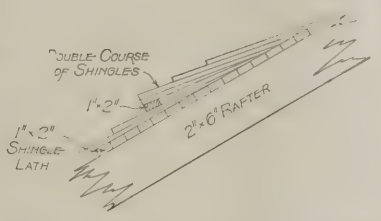
Section Through Porch Rail—Scale 1½ In. to the Foot



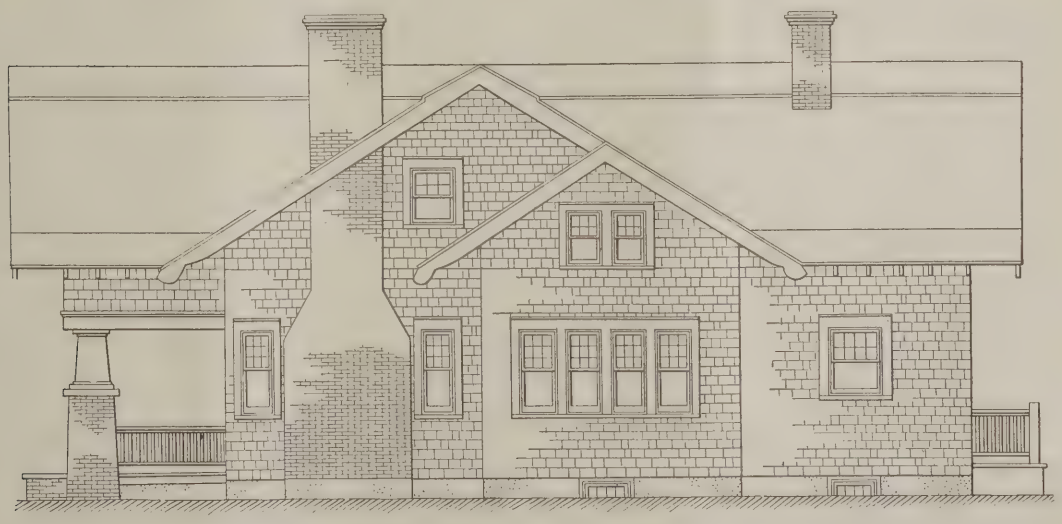
Vertical Section Through Front Porch—Scale ¼ In. to the Foot



Elevation of Verge Rafter—Scale ½ In. to the Foot



Section Through Roof at the Ridge —Scale ½ In. to the Foot



Side (Right) Elevation Showing Outside Chimney—Scale 3/32 In. to the Foot

clean-out door at the cellar floor level. A trimmer arch of brick supports the fireplace hearth which is finished with red Welsh quarried tile. The back of the fireplace as well as the sides have firebrick lining. A Covert throat damper connects the fireplace with the smoke chamber and terra cotta flue lining.

All rooms throughout are plastered with three-

brick walls with porous brick bottoms laid dry.

Framing timbers are of spruce, the sills and posts being 4 x 6 in. and the studs 2 x 4 in. placed 16 in. on centers. The plates also are 4 x 4 in. The girders in the cellar supporting the first floor joists are of spruce 6 x 8 in., resting on 4-in. Lally iron columns filled with concrete. The first and

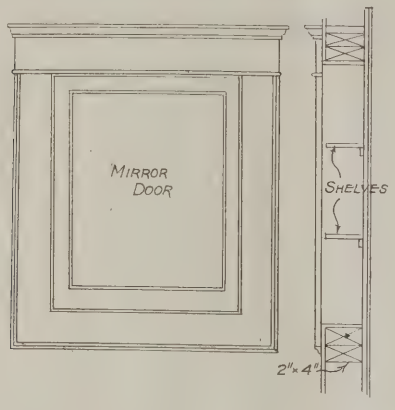
second floor joists are of 2 x 10 in. spruce placed 16 in. on centers and the ceiling beams and rafters are 2 x 6 in. All headers and trimmers around stair wells and openings are 4 x 10 in. All floor beams are doubled under partitions and the partitions over girders extend down to them instead of resting on top of the joists, thereby reducing shrinkage. All wide partitions are bridged once in their height with pieces of 2 x 4 in. stuff cut in horizontally.

The outside walls of the house are covered with 7/8-in. shiplap sheathing boards, over which is placed one thickness of Neponset waterproof building paper well lapped. Over this in turn are laid red

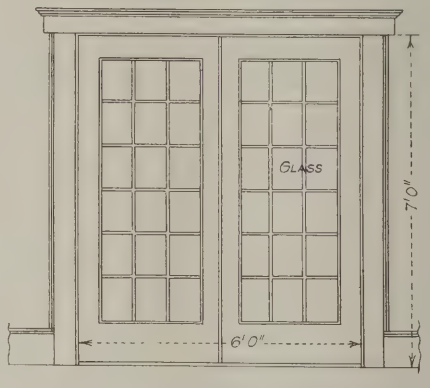
It will be seen that the second floor projects over the front veranda. This is supported by two columns with two steel channel bars with iron column from brick pier to underside of the second floor. This method was used so that the weight of the floor beams and building would be taken up properly and prevent the front second story wall from sagging in the center. This construction is shown in the details on another page.

The porch floors were laid with 1¼ x 3 in. tongued and grooved cypress embedded in white lead with floor timbers of 2 x 8 in. spruce.

First and second floors have 7/8 x 8-in. tongued and grooved under flooring well nailed to each bear-



Elevation and Section of Medicine Cabinet—Scale ½ In. to the Foot



Elevation of Doors Between Living Room and Library—Scale ¼ In. to the Foot



Elevation of Wall in Dining Room Showing Built-in Buffet with Vertical Section—Scale ¼ In. to the Foot

Perfection cedar shingles exposed 5½ in. to the weather. All shingles were dipped in creosote shingle stain at least two-thirds their length before being laid.

On the rafters were laid 1 x 2 in. shingle lath to carry the red Perfection cedar shingles, which were exposed 5 in. to the weather and which were fastened in place with zinc-coated nails. All overhangs on the roofs were laid with 1 x 6 in. matched beaded white pine well secured to the building and nailed on the second rafter from the face of the building so as to properly stiffen it. In addition to this, large brackets were nailed to the sides of the building to support the verge rafters.

ing and with joints broken on bearings only. The flooring is fitted tight up against the outside sheathing and over it was placed one layer of building paper. On this in turn was placed the finish floor of 7/8 x 3-in. tongued and grooved comb grained pine except in the kitchen where 7/8 x 3-in. tongued and grooved maple was laid.

All windows have stock frames of white pine with pulley stiles and parting strips of hard pine. The sills are rabetted and of 2-in. stock. All double hung sashes are provided with Silver Lake sash cord and balance weights.

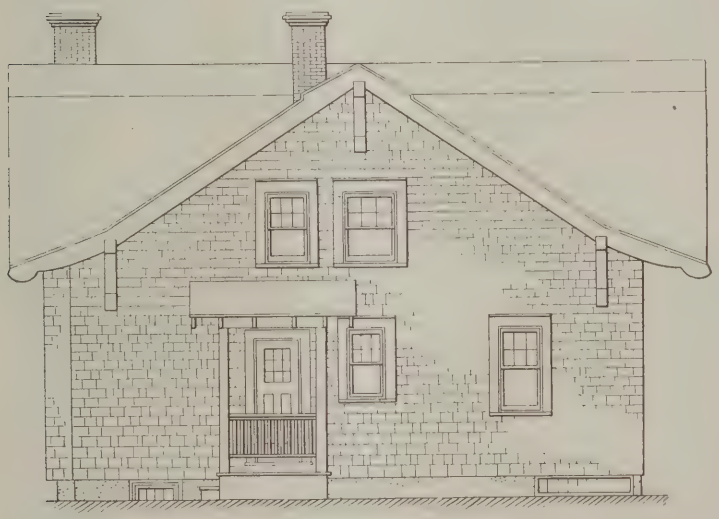
All interior doors on the first floor are of chestnut, of the one-panel type. The front and rear out-

side doors are of white pine, painted. All doors on the second floor are of birch and are 1½ in. thick of the two-panel type.

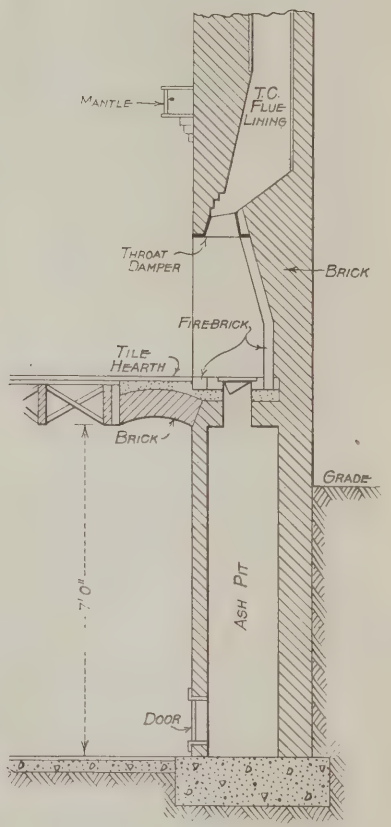
The chestnut trim on the first floor is stained and waxed and the whitewood trim on the second floor is finished white enamel with two-panel birch doors finished natural. The steam heating plant has an American Ideal boiler and radiators. All pipes in the cellar are covered with air cell sectional asbestos covering, and the boiler is covered with asbestos cement.



Buttressed Opening Between Living Room and Dining Room—Scale ¼ In. to the Foot



Rear Elevation—Scale 3/32 In. to the Foot



Vertical Section Through Fireplace Showing Construction—Scale ¼ In. to the Foot

The house here illustrated and described was erected at Haworth, N. J., for E. W. Bill in accordance with plans and specifications prepared by Architect J. L. Theo. Tillack of 150 Nassau St., New York City.

The contractors executing the work were the Commonwealth Building Company, 50 Church Street, New York City.

PLUMBING IN PUBLIC BUILDINGS

The advantage of having shower baths in addition to the usual sanitary conveniences in buildings used by public officials has been demonstrated in many instances. Such provision has been made in old buildings by the office holder, and during hot weather the refreshment attending a shower bath better qualifies him for the exacting services required. Recognition of their value is being shown in the plans of new buildings in various centers. The new county-city building of Pittsburgh, Pa., provides a private bath of the shower type in the lavatories for the heads of all departments and similar equipment in the lavatories used by the employees. This is in harmony with the equipment now provided in first-class hotels where the traveling man has had his demands satisfied in the provision of a shower bath in his room, even in some cases to the exclusion of the bathtub.

COLLECTION OF FOREIGN AND DOMESTIC WOODS

What is probably the best collection of foreign and domestic woods in panel form in this country is now being installed on the second and third floors of the new Forestry Building of the State College of Forestry at Syracuse, N. Y. For the past two years search has been made throughout the country for available commercial varieties of wood native to this country, as well as the important commercial

woods from South America, Mexico, the West Indies, Africa and the East Indies.

Among the rare foreign woods that will be displayed as panels around the rotunda in the College of Forestry Building are African gaboon, East India koa, marblewood, East India rosewood, satinwood, camphor wood, teak, Circassian walnut and eight different kinds of mahogany. Among the western woods of this country displayed are Douglas fir, California redwood, sugar pine, Western yellow pine, Sitka spruce, Port Orford cedar, incense cedar and several varieties of eucalyptus. The Southern forests are represented by cypress, Southern hard pine, North Carolina pine, red and black gum, cucumber and persimmon. A great variety of native hard and soft woods found in New York are the nucleus around which these rarer woods are gathered.

The collection of panels of native and foreign woods built into the rotunda of the College of Forestry Building at Syracuse are being finished carefully to bring out the natural grain to best effect and at the same time to detract as little as possible from the native color and natural wood fibers. Each panel is to be labeled with the common and scientific name so that both the student body of the college and the many visitors who come to the building may study a permanent exhibit of unusual interest and value. Lumber manufacturers' associations and lumbermen throughout the country have been cooperating very cordially with the New York State College of Forestry in supplying these panels.

BUILDING CONSTRUCTION IN CHICAGO

Building construction in Chicago for the month of August showed a decrease of 39.21 per cent as compared with the corresponding period a year ago. The first eight months of the year, taken in the aggregate, still show a gain of 40.55 per cent as compared with the same months in 1915. Permits were taken out in August for 758 buildings fronting 21,262 ft., with a total estimated cost of $5,783,000, as against 995 permits, 28,870 ft. frontage, and $9,513,150 for August, 1915. The construction of apartment buildings continues to be the feature of the operations.

OPPORTUNITY FOR FOREIGN TRADE

The American Consulate General at Paris, France, has issued a notice to American exporters calling attention to the fact that after the conclusion of peace there will be an excellent opportunity for American manufacturers to secure a goodly share of the French import trade, provided they conform to French custom in regard to quotations, terms of delivery, etc. As being of interest in this connection, René Gruet, architect, of 77 Rue Reaumur, Paris, states that the address of THE BUILDING AGE having been given him by the United States Consulate, he desires to announce to patrons of the paper that he has established, with the help of some of the best builders of Paris, an important firm for the handling of building materials, etc., and he will be glad to take the exclusive agency for France and Belgium of one or more articles used in connection with building construction.

TENEMENT HOUSE CONSTRUCTION IN NEW JERSEY

A report just issued by Miles W. Beemer, secretary of the Board of Tenement House Supervision of New Jersey shows that during the month of August tenement house construction in that State was slightly less both as regards the number of buildings approved and the amount of vested capital involved than in the same month a year ago. A comparative statement of the tenement operations for August, 1916 and 1915, is as follows:

	1916	1915
Athenia	.....	$4,000
Bayonne	$25,000	16,000
Bloomfield	.....	5,000
Bradley Beach	8,000	.....
Cliffside Park	15,000	.....
Clifton	9,000	16,000
East Orange	47,000	.....
East Rutherford	.....	5,000
Elizabeth	.....	40,000
Garfield	19,000	3,000
Irvington	15,000	30,000
Jersey City	195,000	107,000
Kearny	6,000	.....
Montclair	15,000	15,000
Newark	48,000	63,000
North Arlington	5,000	.....
North Bergen	.....	4,000
Passaic	80,000	13,000
Paterson	25,000	11,000
Perth Amboy	6,000	12,000
Summit	.....	4,000
Town of Union	.....	20,000
Weehawken	.....	150,000
West Hoboken	.....	14,000
West New York	29,000	16,000
West Orange	.....	12,000
Totals	$547,000	$560,000
Alterations	14,000	21,000
	$561,000	$581,000

According to this showing, Jersey City had the largest gain and Weehawken recorded the largest falling off in operations.

THE COMING COMPLETE BUILDING SHOW

Announcement has been made by Ralph P. Stoddard of the National Complete Building Exposition that the Second American Complete Building Show will be held in the Grand Central Palace, New York City, on March 5 to 11, inclusive, 1917. Plans are under way to make this much larger, more diversified and comprehensive display than was the First American Complete Building Show, held in Cleveland in February last. It will be recalled that the show is patterned somewhat after the well-known Building Trades Exposition held every year in London, England, and which has been a complete and comprehensive educator for the building industry and the prospective home owner of Great Britain and the continent of Europe.

Work on a building operation of 146 dwellings, apartments and stores, estimated to cost $500,000, is about to be begun in Chester, Pa.

COTTAGE HEATED BY PIPELESS FURNACE

EQUIPMENT WELL ADAPTED TO THIS TYPE OF BUILDING —ROOMS HEATED WITH ECONOMICAL FUEL CONSUMPTION

IN view of the popular reception that has been accorded the so-called "pipeless" furnace within the past year, it may not be without interest to present some particulars of a low-cost cottage in the Middle West in which this type of equipment has been installed. The work is a striking example of the adaptability of such a heating plant to this type of building and the installation should command attention both from the standpoint of economy with reference to its initial cost and to maintenance. The data will prove of special value at this time of the year—a season when contractors are busy installing heating equipment in homes that have been recently completed or are rapidly approaching that stage of construction. The subject of the present article is a comfortable home of five rooms in Harvey, Ill., a town of 7000 people, about 20 miles south of Chicago. The completed structure represents an investment slightly in excess of $2,000, and the furnace installed cost about $80.



COTTAGE BUILT BY J. C. LAWRENCE AT HARVEY, ILL., AND HEATED BY MEANS OF A PIPELESS FURNACE SYSTEM

The building has a pleasing exterior treatment of stucco which harmonizes with the dark brown of the porch columns, window frames and sills, as well as other exposed woodwork. The building faces west, and the rooms are so arranged that those occupied during the day receive the full benefit of the sun throughout the day. The roof is covered with dark red asphalt shingles and the dormer on the west front adds to the architectural appearance when viewed from the street.

The cellar is 7 ft. 4 in. high and well lighted by seven windows. In the northeast corner is a cistern built of concrete blocks, having an approximate capacity of 1350 gals. A view of this appears in one of the pictures accompanying this article.

The cellar floor is of concrete resting on a 3-in. bed of cinders graded toward the floor drain. The mixture consists of one part Portland cement, three parts sand and five parts of stone screenings. The top finish is ½ in. thick and contains one part cement to two parts sand, the work being properly floated and troweled.

The footings are of concrete throughout and are exceptionally heavy, being built below the frost line to prevent cracking under extreme climatic conditions. The foundation walls are of 8 x 8 x 16 in. unfaced cement blocks, forming 8-in. walls. On completion of the basement work, the inside surfaces

were treated with a wash of cement and Medusa waterproofing, while the exterior was left untouched so far as a finish coat was concerned.

The cistern was constructed as the basement walls were laid up, the same size blocks being used in both cases. As the work progressed the blocks were bonded into the walls to insure a rigid and substantial job and the hollow centers of the blocks filled with sloppy concrete. The inside walls of the cistern were given a brush coat of Medusa waterproofing when completed.

The framing is of yellow pine, the sills being 2 x 6 in., the outside studs 2 x 4 in. ribbon boards 1 x 6 in., floor joists 2 x 10 in., placed 16 in. on centers, and with a good grade of building paper placed between the rough and finish floors. Stud partitions are 2 x 4 in. doubled at all openings, the heads of the latter being well bridged and braced. On each side of the building and at either end were run two rows of 2 x 4's from the plates to the sills, giving additional bracing to the construction. The ceiling joists are 2 x 3 in., extended to form part of the cornice, while the rafters are 2 x 4 in. placed 16 in. on centers. After the roof had been framed one layer of building paper was applied, the final covering consisting of asphalt shingles, exposed 4 in. to the weather. The shingles are of a type made by the Beckman-Dawson Co., 19 South La Salle Street, Chicago, Ill.

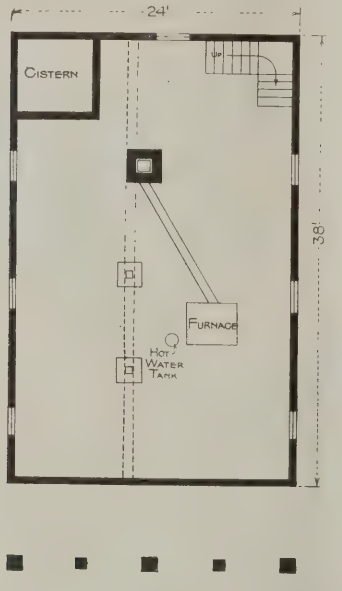
The chimney is built of square cement blocks, of special design made by The Multiplex Concrete Machinery Co., Elmore, Ohio. Bishopric board, made by the Mastic Wall Board & Roofing Co., Cincinnati, Ohio, is nailed direct to the studding. On account of the elimination of sheathing it was deemed advisable to place a 6d. cement-coated box nail in every lath to form a strong bracing and stiffening, and the joints in this work were broken every 3 ft. and properly rabetted behind the frame.

Interior plastering consists of one coat of wood pulp and a hard white finish coat. Outside plastering is made up of one coat of cement and lime mortar, well fibered, and a second coat consisting of 80 per cent cement mortar and 20 per cent lime mortar, with a dash coat of 1½ parts of crushed stone screenings and one part of cement.

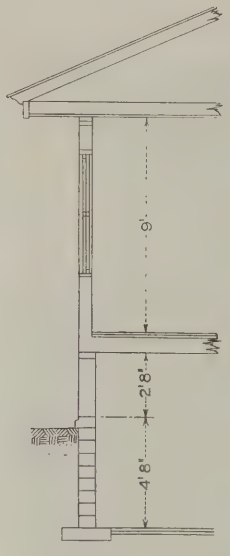
The finish floors are of quarter sawed yellow pine, oak stained, with the exception of the bedrooms, which have a flat grain, while maple floors are provided in the kitchen, pantry and bathroom. The contractor had particularly good success in staining yellow pine trim to imitate oak, and the products used in this operation are made by the Pitcairn Varnish Co., of Milwaukee, Wis. All interior floors and trim were stained and shellaced one coat each and given a final coat of varnish. All doors are of yellow pine, two-panel stock design.

The bathroom contains one "Trapera" closet with high tank, one 5-ft. "Nioba" bathtub, and one 18 x 21-in. lavatory, complete with two faucets. In the kitchen is a 20 x 30-in. two-piece enameled iron sink, with long back and drainboard and three faucets. In the attic is a galvanized iron tank having capacity for 5 bbls., to which water is pumped from the cistern through the medium of a New Alert hand pump. Rain water is discharged from the roof to the cistern through the downspouts and then pumped to the attic tank, from which point connections are made to the fixtures in the kitchen and bathroom. The plumber connected a 30-gal. hot-water tank to the coil in the furnace, while arrangements for gas supply to the hot-water equipment were also made. The plumbing fixtures throughout are of types made by the L. Wolff Manufacturing Company, Chicago, Ill.

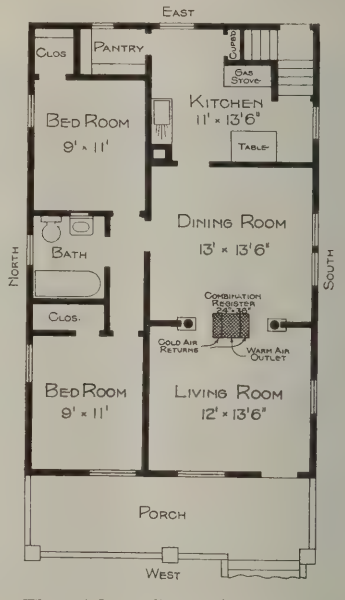
The heating equipment consists of a No. 45 "Leader" warm-air "pipeless" furnace, made by the Hess Warming and Ventilating Co., 1201 Tacoma Building, Chicago, Ill. The furnace is of all-steel construction, made with welded joints, which pre-



Basement Plan—Scale 1/16 In. to the Foot



Section Through Main Wall of the House



Floor Plan—Scale 1/16 In. to the Foot

vents the escape of smoke and gases; has a rated capacity of from 12,000 to 16,000 cu. ft., and connects with a combination register face opening measuring 24 x 36 in.

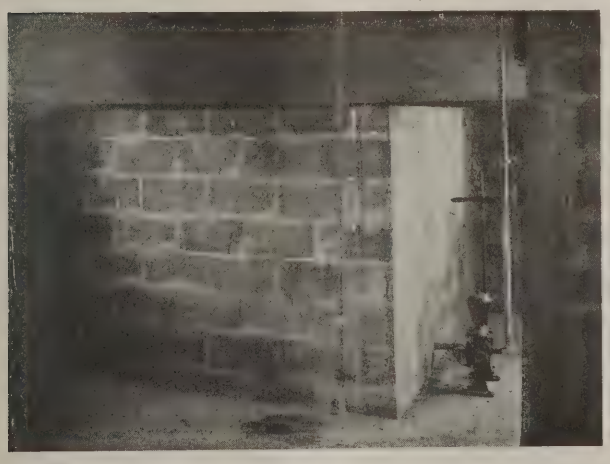
As shown on the basement plan, the furnace is set slightly off the center of the basement to supply an abundance of warm air through the register, which is placed at a point between the living and dining rooms. The furnace is set directly beneath



Rear View of House Showing Window Exposure

the register, which is divided into three sections; a central heat outlet, with cold-air return inlets on either side. All of the heat from the furnace is discharged upward through the central part of the register, and the two end openings are connected with outer spaces on the sides of the furnace. The inner casing, forming one side of the return air passageways, terminates about 8 in. from the basement floor, so that the air will circulate beneath it, and the space beneath the outer and inner casings is about 6 in.

When the heated air leaves the register it rises to the ceiling and diffuses through all the rooms which are open to the main room in which the register is

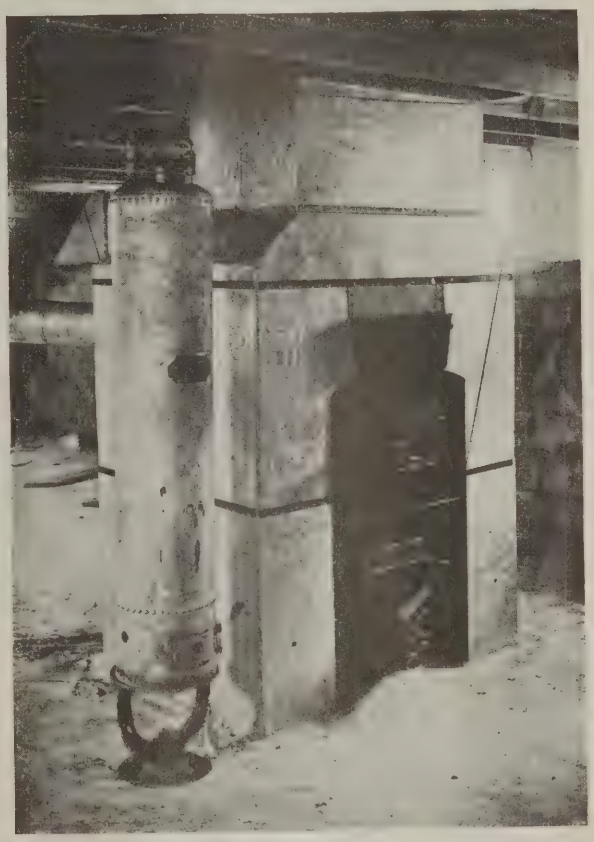


Cistern in the Northeast Corner of the Basement

installed. It will be seen, therefore, from the accompanying first floor plan that all interior doors must be left open in order that the warm air may circulate throughout the house and penetrate the bedrooms, bathroom and kitchen, which are farthest from the register. The introduction of a large volume of warm air naturally displaces the colder air, which, being heavier, descends to the floor and is being constantly drawn back into the furnace through the two return air inlets in the register, insuring a rapid and constant circulation of air.

It is well to point out that the "pipeless" furnace is not a solution of all heating problems, as it has its limitations, but is recommended by the manufacturer as especially adapted to buildings where a number of smaller rooms open into one or two main living rooms.

One of the strongest points urged in favor of the "pipeless" furnace is its economical fuel consumption. The installation of a "pipeless' furnace is extremely simple and the amount of cutting in the floor is confined to one opening as no stacks are re-



Front View of the Heater Showing Hot Water Boiler

quired. The equipment is installed without horizontal pipes, which means that no heat is lost by radiation and waste heat in the basement is reduced to a minimum because of the insulation afforded by the cold air chambers on either side of the furnace.

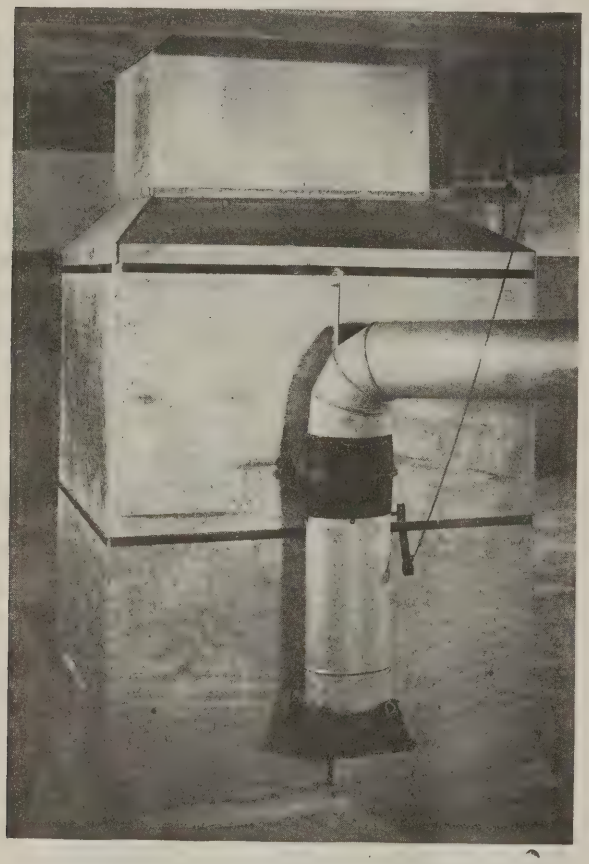
An examination of the front view illustration of the furnace shows a large water pan over the feed door, to provide a proper percentage of moisture.

The contractor and builder for the cottage here shown was J. C. Lawrence, 15322 Center Avenue, Harvey, Ill., who also prepared the plans and supervised the construction. Through his courtesy we are able to present a few figures of cost showing the total to be $2,021.80.

Estimate of Cost

Excavating and grading	$25.00
Foundations	200.00
Lumber and trim	507.80
Carpenter work	300.00
Plumbing	262.00
Electric lighting and fixtures	50.00
Furnace heating	80.00
Hardware	25.00
Lathing, plastering, stucco and wall board	422.00
Sheet metal work	20.00
Painting	70.00
Roofing	60.00
	$2,021.80

The building was completed in August of the present year and is an excellent example of a resi-



Rear View of Pipeless Furnace Showing Smoke Pipe

dence that can be erected in any part of the country to accommodate a small family and for a sum well within the limits of a moderate income.

USE OF BRICKS IN NEW YORK

Greater New York is the leading common-brick market in the United States, about a billion brick being used there annually. The principal source of this supply is, according to the United States Geological Survey, the Hudson River region, extending on both sides of the Hudson from New York to Cohoes, including Bergen County, N. J., and within the last few years the Raritan River district, Middlesex County, N. J., has sent large quantities of common brick to New York.

In 1915 the output of common brick in this region was 960,527,000 brick, valued at $5,009,065, or $5.21 per thousand. This was an increase of 72,261,000 brick and $658,233 and of 31 cents per thousand over 1914.

The New York portion of this region marketed 741,568,000 common brick in 1915, valued at $3,744,548, or $5.05 per thousand, which was about three-fourths of the quantity and value of the entire region and was an increase of 62,448,000 brick and $461,149 and of 22 cents per thousand over 1914. Ulster County was the leading county in production and value of common brick, reporting 229,343,000 brick, valued at $1,110,492, or nearly a third of the output and value of the New York portion of the region, an increase of 42,962,000 brick and $214,186 over 1914. Dutchess County was second and Rockland County third.

New Jersey's portion of the production of the region was 218,959,000 brick, valued at $1,264,517, an increase of 9,813,000 brick and of $197,084 compared with 1914. The average price per thousand increased 68 cents compared with 1914.

AN UNUSUAL STORE DESIGN

An unusual store design has been drawn by Architect Frank M. Tyler for a building to be erected on Olive Street, near Eighth, Los Angeles, Cal., which will have a frontage of 60 ft. and a depth of 150 ft. The street floor will be occupied by three stores, with the usual plate-glass fronts; while the second floor is designed on lines of the Tudor period, with a facing of white stone and red ruffled brick, and slate roof. The general construction of side and rear walls will be of brick.

COST OF BUILDING OPERATIONS IN 1915

Building operations in many of the larger cities of the country increased in 1915 according to the United States Geological Survey, Department of the Interior. In 48 selected cities the total cost of building operations was $641,769,199, an increase of $22,016,845, or nearly 4 per cent over 1914. Twenty-eight of these cities showed increase and 20 showed decrease.

New York was the leading city in cost of building operations, with $103,023,800, an increase of $28,993,559 over 1914. Chicago, which was the leading city in 1914, was second in 1915, with building operations costing $97,291,400, an increase of $14,029,690. Brooklyn was third, with a total of $45,601,851, an increase of $3,729,544 over 1914.

The number of permits issued or buildings erected in 1915 in these 48 cities was 201,190, a decrease of 2,542 compared with 1914. The number of permits or buildings ranged from 469 in St. Joseph, Mo., to 14,515 in Brooklyn, N. Y. The average cost per operation was $3,190 in 1915 compared with $3,042 in 1914.

One million dollars' worth of Carthage stone and polished marble, it is said, will be used in the $15,000,000 Hotel Commonwealth, planned to be erected in the Times Square district of New York City.

BRIEF REVIEW OF THE BUILDING SITUATION

BUILDING OPERATIONS FOR AUGUST IN 123 CITIES SHOW ONE PER CENT DECREASE COMPARED WITH AUGUST, 1915

THE reports which come to hand from all sections of the country indicate that building operations are being conducted upon practically the same scale of activity as prevailed a year ago at this time. It is true, some sections indicate a striking increase in activity while others report a shrinkage in the planning of new construction work so that one just about offsets the other. The figures for August presented herewith covering 123 cities of the country indicate a loss of 1.1 per cent, as compared with August, 1915. In considering the four zones into which we have divided the country for the sake of comparison, the Eastern section shows a falling off of 11.2 per cent as compared with last year, there being 49 cities reporting, of which 26 show increases and 23 decreases.

CITIES IN EASTERN STATES

	August, 1916	August, 1915
Albany	$880,575	$249,745
Allentown	225,735	236,835
Altoona	120,217	114,063
Auburn	73,800	21,524
Bayonne	118,530	83,537
Binghamton	296,754	278,917
Boston	3,896,878	4,752,000
Bridgeport	643,304	842,735
Brockton	149,812	142,040
Buffalo	1,756,000	1,175,000
East Orange	43,618	83,368
Elizabeth	274,943	95,523
Erie	313,399	272,990
Harrisburg	107,749	29,125
Hartford	547,390	528,934
Haverhill	133,200	108,100
Hoboken	95,623	21,565
Holyoke	41,700	88,975
Lawrence	68,200	126,244
Manchester	164,806	206,765
Newark	564,801	569,441
New Bedford	111,840	197,260
New Haven	383,705	440,274
New York:		
Manhattan	4,350,001	7,960,328
Bronx	1,074,188	1,620,725
Brooklyn	2,159,610	3,511,950
Queens	1,167,582	1,413,661
Richmond	1,096,720	164,318
Niagara Falls	167,265	148,375
Passaic	132,650	137,826
Paterson	159,353	182,946
Philadelphia	4,472,120	3,993,625
Pittsburgh	1,428,967	740,265
Quincy	480,355	161,499
Reading	112,500	181,150
Rochester	557,730	772,174
Scranton	155,117	88,779
Schenectady	187,202	143,774
Springfield	370,105	400,095
Syracuse	131,958	363,540
Trenton	227,992	258,026
Troy	414,760	82,465
Utica	125,050	235,935
West Haven	60,805	70,690
Wilkes-Barre	64,314	55,032
Winston	58,065	180,000
Worcester	628,176	534,538
Woonsocket, R. I.	36,245	30,875
Yonkers	242,600	323,300

From the central portion of the country we have reports covering 37 cities, of which 25 show increases and 12 decreases, with a resultant gain of 4.74 per cent, as compared with August last year. The striking feature is the heavy falling off in projected buildings in Chicago, Cincinnati and Milwaukee, while notable increases are found in Akron, Cleveland, Detroit, Indianapolis, Kansas City, Minneapolis, St. Louis and Toledo.

CITIES IN MIDDLE STATES

	August, 1916	August, 1915
Akron	$2,400,000	$499,010
Cedar Rapids	117,000	125,000
Canton	293,605	115,125
Chicago	5,783,000	9,513,150
Cincinnati	1,328,490	3,048,475
Cleveland	2,752,445	1,986,520
Columbus	548,720	544,895

CITIES IN MIDDLE STATES (Continued)

	August, 1916	August, 1915
Dayton	$250,775	$403,890
Davenport	79,180	182,705
Des Moines	139,183	151,500
Detroit	4,390,425	3,217,590
Dubuque	106,650	71,895
Duluth	289,759	262,051
East St. Louis	157,069	91,420
Evansville	129,866	101,455
Fort Wayne	266,240	176,530
Grand Rapids	398,644	281,765
Indianapolis	1,018,995	470,432
Kansas City, Mo.	1,211,225	725,830
Kansas City, Kan.	51,385	80,863
Lincoln	266,130	133,015
Milwaukee	611,152	1,132,551
Minneapolis	1,403,895	1,031,070
Omaha	652,835	350,610
Peoria	431,300	114,810
Saginaw	72,350	72,085
South Bend	131,997	119,316
St. Joseph	65,995	103,428
St. Louis	1,162,253	932,446
St. Paul	978,667	1,065,942
Sioux City	186,475	258,975
Springfield, Ill.	193,970	109,500
Superior, Wis.	250,940	111,365
Terra Haute	48,375	53,232
Toledo	1,348,197	747,083
Topeka	152,018	66,719
Youngstown	293,500	154,815

The greatest increase in building operations is found in the Southern tier of states from which 19 cities make reports indicating a gain of practically 31 per cent over August, 1915. This is due largely to the greater volume of permits issued in Baltimore, Birmingham, Dallas, Fort Worth, Jacksonville, Oklahoma City, Richmond and Washington.

CITIES IN SOUTHERN STATES

	August, 1916	August, 1915
Atlanta	$323,690	$372,175
Baltimore	627,945	447,923
Birmingham	248,741	137,615
Chattanooga	93,825	46,540
Dallas, Tex.	310,499	155,117
Fort Worth	333,707	127,265
Huntington	127,560	83,368
Jacksonville	199,735	40,432
Macon	152,542	37,915
Memphis	281,765	273,295
Montgomery	26,040	61,335
New Orleans	143,445	246,708
Norfolk, Va.	70,504	75,632
Oklahoma City	125,770	86,820
Richmond	359,566	197,019
Savannah	96,590	442,805
Tampa	118,135	103,910
Washington	1,192,778	742,773
Wilmington	188,411	154,368

Coming now to the extreme Western section of the country and including the territory lying west of Denver, we have 18 cities reporting a gain of 12.29 per cent, as compared with August last year. The notable increases are found in Denver, Pasadena, Sacramento, Salt Lake City, Seattle, Spokane and Tacoma. Decreased activity is reported from Oakland, Portland and Stockton.

CITIES IN EXTREME WESTERN STATES

	August, 1916	August, 1915
Berkeley, Cal.	$120,475	$134,900
Colorado Springs	30,981	6,975
Denver	261,950	179,810
Los Angeles	1,037,320	1,001,980
Oakland	416,810	506,041
Pasadena	263,705	104,057
Portland	497,385	728,970
Pueblo	30,945	54,740
Sacramento	252,630	62,953
San Bernardino	13,735	33,750
San Diego	71,673	62,770
Salt Lake City	277,828	213,300
San Francisco	993,020	970,090
San José	24,897	34,333
Seattle	668,764	454,960
Spokane	127,960	50,335
Stockton	86,390	116,355
Tacoma	180,675	54,378

CURRENT NEWS OF BUILDERS' EXCHANGES

NEW OFFICERS, OUTINGS, MEMBERSHIP CAMPAIGN, ATHLETICS AND OTHER ITEMS OF INTEREST

Model Home Contest of the Detroit Builders' and Traders' Exchange

THE interest shown by members of the Builders' and Traders' Exchange of Detroit, Mich., in the steps which are being taken to secure an ordinance to provide for better housing conditions for the workingmen of the city is such as to cause the contemplation of a contest for model houses of a type calculated to meet the requirements of that class of workers. It has been suggested that a prize of a silver loving cup be awarded to the member who submits the best plan for a house costing from $1,200 to $1,500. $1,500.

The members of the Exchange are enthusiastic supporters of the baseball team known as the "Detroit Tigers." As a token of appreciation of their loyalty, Frank Navin, owner of the Tigers, invited the Exchange to be his guests at the game played with St. Louis on Sept. 7. Over 500 members accepted and formed themselves into a motor car parade, which, headed by a band, formed a triumphal entry into the ball park.

The Exchange reports the addition of a number of new members and several new exhibits have been added to the Permanent Building Exposition.

The Los Angeles Builders' Exchange

At a meeting of the Los Angeles Builders' Exchange, held on Aug. 11, the Special Committee appointed a month before to map out plans to be followed by the organization asked for more time, owing to the complication of its problems. Our correspondent, writing under date of Sept. 5, says in regard to the matter: The committee has found Los Angeles people to be unlike those of many other communities, in disposition to disregard conventional methods, and especially in tendency to eliminate the architect in building. In this connection Secretary Walter Risk remarked that within recent years "hundreds of poorly informed people have suffered disaster by placing themselves in the hands of irresponsible so-called architects, who promised to 'take care of everything.'"

New standing committees on Finance, Publicity, Law and Rules, Employment, Educational, Floor and Membership were appointed. The Exchange has recently received a number of new members.

The Quad-City Builders' Exchange

Members of the Quad-City Builders' Exchange, which comprises the cities of Moline, East Moline, Rock Island, Ill., and Davenport, Iowa, enjoyed their first annual river outing on Saturday, Aug. 12. More than 300 participated in the trip up the river to Smith's Island, where a program of athletic events was given. The voyage was made on the steamer Marquette and barge, the boat leaving the tri-cities at 2.15 o'clock in the afternoon and returning after 9 o'clock.

A band furnished music during the day, while other entertainment was furnished on the boat. Besides the local contractors were delegations from Clinton and Burlington, Iowa. C. P. Massard, secretary of the Iowa Builders' Association, was in attendance, as well as many master plumbers.

With a view to improving conditions in connection with the awarding of contracts the Exchange recently appointed a committee for the purpose of drafting a Code of Practice for bidding on contract work. As a result of the efforts of this committee, it was decided that beginning Sept. 1 the members use, when competing, the Nelson Form of Choosing Bidders and Awarding Contracts, of which Herman W. Nelson of Moline, Ill., is the author. The committee also decided the factors which shall be used by the various branches of the building industry in asking pay for competitive bids. The Exchange has furnished to members a sign to hang in their offices to notify the public that hereafter they will ask pay for figuring in competition.

In order to make plain what the member is expected to do, we present the following paragraphs from the recommendations of the committee:

> If a customer asks you to figure a job, you will hand him one of the "bidders' agreements" and tell him that you will estimate his work on that basis only.
>
> If he wants to give you the job, without asking other bidders for figures, then it doesn't make any difference to him whether you charge him for figuring or whether you include the charge in your figure on the work.
>
> He must pay for this work anyway, and always does, directly or indirectly.
>
> If he or his architect wants your figure to compare in competition with other bids and then "reserve the right to accept or reject any or all bids," then they should pay you for your work.

New Secretary of Dayton Builders' Exchange

The many friends of Thomas P. Kearns, former State Inspector of Workshops and Factories, will be interested in learning that he has been appointed secretary of the Builders' Exchange of Dayton, Ohio, succeeding Michael Redelle, who has become welfare director for the Dayton Engineering Laboratories Company.

Johnstown Builders Contemplate an Exchange

The contractors of Johnstown, Pa., are busily discussing the advisability of organizing a Builders' Exchange. The project was first broached last fall, but opposition developed which it is now hoped will be removed. It is expected that the Master Builders' Association will take up the matter in the near future and the younger element is especially anxious to see the project succeed.

New Officers of the Regina Builders' Exchange

At the recent annual meeting of the Builders' Exchange of Regina, District of Saskatchewan, Canada, the following officers were elected:

President.....W. M. Wilson
Vice-President.....D. D. Smith
Secretary.....M. L. Moyer
Treasurer.....A. Young

The executive committee is composed of W. R. Harris, R. J. Lecky, D. J. McKay, W. R. Talbot, W. Whiteford, J. M. Adam, W. J. Hastings, J. M. Taylor and T. A. Wilson.

Reorganization of Montgomery Builders' Exchange

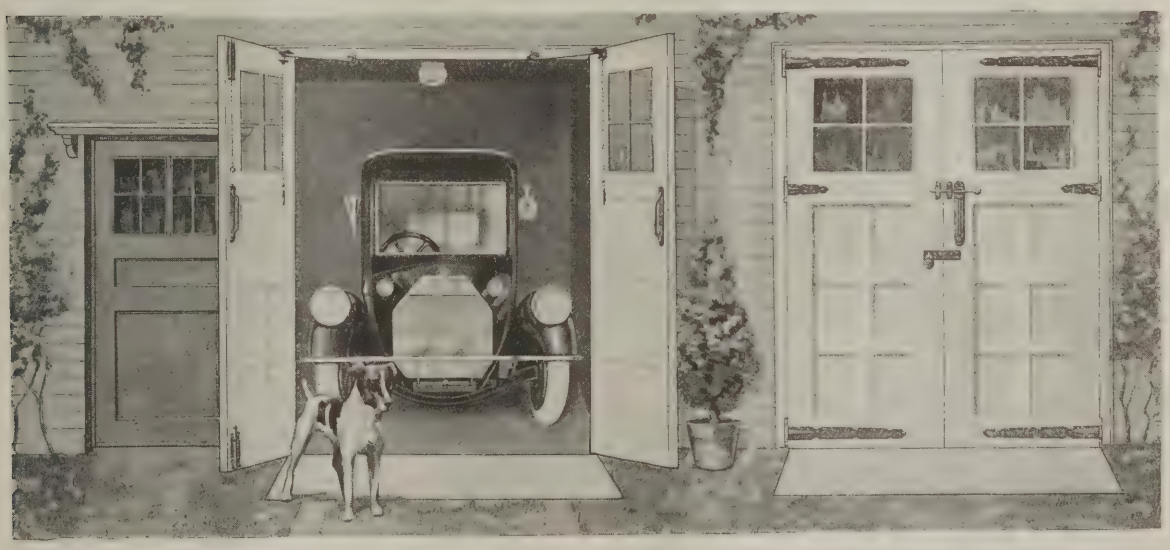
It has been decided to reorganize the Builders' Exchange of Montgomery, Ala., and to so enlarge its sphere of usefulness as to practically make it a new organization. This was decided on at a meeting held on Aug. 25, some forty of those prominently engaged in the building business being in attendance.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

The Garage Door Problem

Just at the present time there seems to be considerable discussion as to the proper method of opening heavy garage doors and arguments have been presented pro and con as to the best way in which this can be satisfactorily accomplished. With more than two million pleasure automobiles in daily use in the United States, any problem connected with garage construction should prove of more than passing interest to builders, carpenters and contractors. The first garages were built with their doors swung on hinges, but the hinges on the market at that time were rather roughly finished. An old-fashioned strap or T-hinge, strong enough to swing a heavy garage door, did not add much to the general appearance of the building and, moreover, at that date there was nothing on the market to prevent the door slamming on a machine coming in or going out of the garage. In order to fully meet the requirements of the case, improvements were made from time to time, with the result that now there are hinges designed especially for garage use.



The Garage Door Problem—Fig. 1—Showing Door Holder Applied and Appearance of Door Hardware in Position

These hinges are made heavy and strong, yet neat in outline and carefully finished. In fact, the hinges are of such a nature as to add materially to the architectural appearance of the garage in connection with which they are used. These hinges are equipped with ball-bearing washers, so that the door in opening does not grind together the wearing surfaces of its hinges, but, on the contrary, literally glide over ball-bearings like the wheels of an automobile. Doors hung on hinges of this nature close snugly; in fact, just as weathertight as the front door of a dwelling. Swinging doors may be safely and easily locked, for the point is made that it is easier to swing garage doors open than to push them back. There is nothing about the door hinge to adjust or get out of order and any carpenter or builder who can hang a house door can produce a good looking, easy working job. In order to prevent the doors from slamming, the Stanley Works, New Britain, Conn., recently placed upon the market a garage door holder consisting of an arm of steel which holds the doors open against the strongest wind. This holder automatically locks the door open and it is released by a pull on a chain. In Fig. 1 of the illustrations is presented a picture showing a pair of garage doors open and closed—one showing the arrangement of the holder, while the other gives an idea of the appearance of the door hardware when applied. In Fig. 2 the holder is shown more in detail.



Fig. 2—Detail of the Door Holder

Asphalt Shingle Re-roofing Week

A double significance will be attached to Monday, Oct. 9, when "National Fire Prevention Day" will be celebrated throughout the country. The occasion will also mark the opening of Re-Roofing Week, an advertising campaign that will be launched by the Asphalt Shingle Publicity Bureau, Old Colony Building, Chicago, Ill., to arouse enthusiasm regarding the value of asphalt shingles—"The Roof that Stays Young." Extensive preparations have been made by the bureau to attract widespread attention on the part of houseowners to one particular feature, that of re-roofing, an opportunity that can be followed up to profitable advantage by progressive contractors and builders. The Bureau

intends to run striking advertisements in several natonal weekly magazines and will also co-operate with manufacturers and dealers in an endeavor to stimulate enthusiasm and arouse interest on behalf of asphalt shingles.

National Fire Prevention Day always has official recognition. It is common practice for state fire marshals to enlist the co-operation of mayors of cities, superintendents of schools, chambers of commerce, associations, clubs, as well as individuals, in urging the public to make every day an occasion for fire prevention. The daily newspapers direct attention to the annual losses that are brought about through the use of inflammable building materials and emphasis is laid on the desirability of using fireproof and fire-resisting building materials.

Here is an opportunity for enterprising contractors and builders to increase their business by taking advantage of such publicity. The early part of October is the time when most people are thinking of repairing their roofs to withstand the siege of the coming winter. The advertising campaign of the Asphalt Shingle Publicity Bureau will make people think seriously of having a roof that can be covered on a repairless basis, and one that will have a lasting appearance. It is wise economy to put repair costs into an investment that will head off future repair bills.

The contractor and builder who is alive to the re-roofing possibilities in his home town and surrounding territory will call to mind numerous prospects that can be influenced at this time. He may ask himself as to the best methods to pursue in getting a large share of the business that will be developed in his territory through this advertising campaign. In the first place, it is desirable to make a list of prospects. A circular letter should then be prepared and mailed promptly, so that the advertising may be made doubly effective. Literature on asphalt shingles should also be sent, all of which should be followed up by personal or telephone calls or further letters. Personal calls make a greater impression on the prospect and bring better results than indirect methods.

Newspapers can be used effectively, for people are always on the alert for news. Call up a reporter and tell him the importance of "National Fire Prevention Day" and be sure and have him quote you on the subject. Then include your talk on Re-Roofing Week and emphasize the importance of asphalt shingles as a fire preventive roofing material. Advertising is sure to attract attention if run in the same issue, and some forceful statements about asphalt shingles run every day during Re-Roofing Week will be profitable. Local interest will be stimulated, and the foundation for future business will be laid in addition to immediate orders that will result from such aggressiveness.

Display cards tacked to buildings under construction will attract the right kind of attention, while similar cards nailed to trucks or wagons will be seen by people all over town. It is simply a question of individual persistency—aggressiveness and enthusiasm backed up by an intelligent knowledge of the merits of asphalt shingles. Contractors and builders will find manufacturers and dealers ready to co-operate in this movement and will be glad to furnish electrotypes, display cards and literature. The time is short, however, and calls for prompt action.

New Myers Faultless Door Hanger

Among the latest candidates for popular favor in the way of a door hanger, is the construction illustrated herewith and which has just been placed upon the market by F. E. Myers & Brother, Ashland, Ohio. It is known as Myers Faultless Adjustable Tandem Door Hanger and Self-Cleaning Track. It is referred to as being simple, rigid and efficient in construction and thoroughly protects the top of the door from the elements. The arrangement is such that lateral adjustment to and from the building is readily made as well as vertical adjustment for the purpose of raising or lowering the door. The wheels or rollers are turned from steel shafting and revolve on hard steel roller bearings. The engine track shown in Fig. 3 is pivoted in the center, allowing it to oscillate and adjust iself to any variation in the track. The lateral adjustment shown in Fig. 4 consists of a heavy screw bolt with a screw head adjusted by means of an ordinary screwdriver. The object of this adjustment is to permit the use of different thicknesses of doors and also to close up all cracks between the door and building. The vertical adjustment



Fig. 3—The Engine Truck

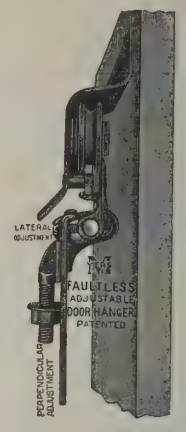


Fig. 4—Showing the Lateral Adjustment

is a heavy iron bolt passing through a part of the hasp. The flexible joint with which the hanger is fitted permits the door to adjust itself to uneven surfaces on the building and also allows it to swing out at the bottom when desired. In Fig. 5 is shown the self-cleaning track, the special feature of which is the continuous opening between the track and the building. The covering or roof of the track is attached to the building at the upper edge by means of lag screws or spikes and extends downward and outward to a point below the top of the door, thus covering it completely and protecting it from the weather. An idea of the construction may be gathered from an inspection of Fig. 4. The track proper is a flat, hard steel bar attached to the cover by means of steel stud rivets, leaving an opening between



Fig. 5—The Myers Self-Cleaning Track

the track and cover through which any dust or dirt will naturally fall, thus insuring a clean runway for the trolley at all times and under all conditions. The track is provided with an end stop made of wrought steel, which closes the end of the track and is held in position by a rivet in the track and a lag screw passing through the center of the track cover and the end stop. This not only stops the door but stiffens the track.

A Federal motor truck recently lent valuable aid in emergency transportation in Nevada, for a forest fire had completely destroyed the town of Verdi and it was necessary to transport troops from Reno as quickly as possible. The truck held thirty-nine men and covered the eleven miles between the two towns in fifty-five minutes. The relief party assisted the sufferers and the truck was used to transport household goods to places of safety and to haul provisions from Reno. The truck was owned by the Verdi Lumber Co. and

(Continued on page 70)





"Neponset" is my middle name, and this shingle is my card. And let me tell you, it's *some* drawing card, too.

My Neponset "card" draws two distinct classes of people into my store; those who can afford shingles of the finest slate, but prefer Neponset Twin Shingles because they have the beauty of slate, they wear like slate and cost much less; and those who know that Neponset Twin Shingles are not only beautiful to look at but give one hundred cents' worth of dependable service for every dollar invested.

So you see my business on

NEPONSET

TWIN

SHINGLES

is brisk. I have an argument "that holds water" that I successfully use on the man who owns a "seven passenger eight" and the fellow who doesn't.

In other words I can convince any man that Neponset Twin Shingles are unquestionably the best shingle value on the market today. The people in my town come to me with their roofing problems and I solve them with Neponset Twin Shingles. That's why I am successful.

If you try, perhaps you can become the Neponset Man in your town.

Send the coupon today for information about the shingle that looks like slate, and possesses many of the advantages of slate, yet which costs no more when laid than good wood shingles. Address

BIRD & SON

(Established 1795)

Dept. B, EAST WALPOLE, MASS.

New York Washington

Chicago: 1434 Monadnock Bldg. Canadian Office and Plant: Hamilton, Ont.

NEPONSET WALL BOARD

For Walls and Ceilings

National Roofing Week

October 9th to 16th is to be known as ROOFING WEEK all over the country.

The combined efforts of thousands of merchants, carpenters, builders and manufacturers is sure to create business.

Get into line. Couple your store with our national advertising and you'll feel the effects of National Roofing Week in more business. Write us for our plans to help you get your share.

BIRD & SON

Dept. B

East Walpole, Mass.

Below is a picture of an attic room made cozy and warm with Neponset Wall Board—another of the famous Bird products.



BIRD NEPONSET PRODUCTS

BIRD & SON, Dept. B, East Walpole, Mass.

Please send me information about Neponset Twin Shingles and Neponset Wall Board. Also a copy of your book, "Repairing and Building." This request does not obligate me in any way.

Name .....

Address .....

Send This Coupon Today

It's the beauty of the enamel that distinguishes KOHLER SINKS

KOHLER enamel is accepted as the *highest expression of excellence* in the enameler's art. It imparts conspicuous *elegance* to every KOHLER Bath Tub, Lavatory and Sink. The hygienic *one-piece* construction of KOHLER Sinks gives them added value.

KOHLER WARE

is of unvarying quality—always the highest

No matter what the *pattern* of a KOHLER product may be, its *quality* is sure to be *the best.*

Special manufacturing economies enable us to put *extra value* and beauty into KOHLER WARE without making the prices prohibitive.

KOHLER Bath Tubs, Lavatories and Sinks are specified for houses and apartments of all classes. These products have the *elegance* that makes them suitable for the most elaborate homes. At the same time they are available for inexpensive houses and bungalows.

Write for our interesting book, "KOHLER OF KOHLER." It will give you some new ideas about Enameled Plumbing Ware.

"It's in the Kohler Enamel"

KOHLER CO.
Founded 1873
Kohler, Wis., U.S.A.

BRANCHES

Boston	Detroit	Houston
New York	Chicago	San Francisco
Philadelphia	Indianapolis	Los Angeles
Atlanta	St. Paul	Seattle
Pittsburgh	St. Louis	London

Plate K1007—KOHLER enameled one-piece sink, with right-hand drain board.



is one of the styles manufactured by the Federal Motor Truck Co., Detroit, Mich.

A Practical Exhibit of Willis Ventilators

It is an obvious fact that the only way to secure satisfactory ventilation of a building is to install a proper ventilating system and this applies to structures for whatever purpose they may be used. In Fig. 6 of the illustrations we show a general view of a barn which is equipped with five of the well-known Willis ventilators made by the Willis Manufacturing Company, Galesburg, Ill. The barn is 200 ft. long and 50 ft. wide, and has a 50-ft. wing extending from the main building. The five ventilators shown are of the Louvre style and are said to keep the structure constantly supplied with fresh air. These ventilators are made in various styles and sizes, thus adapting them to meet varying requirements and for any pitch of roof. They are arranged to be ornamented with special styles of weathervanes, thus rendering them ornamental as well as practical. The principle on which the ventilator is constructed is said to be such that the draft is always in the right direction no matter how hard the wind may be blowing. We understand that the company always carries a large stock of these ventilators so as to insure prompt shipments at all times. A general catalog, known as No. 7, has been issued by the company and this illustrates the complete line of Willis products, which embrace practically everything in the line of sheet metal building materials.



Fig. 6—Practical Exhibit of Willis Barn Ventilators

Catalog of Chicago Grille Works

We have just received from the Chicago Grille Works, 836 Wells Street, Chicago, Ill., a copy of Catalog No. 21, containing many new and attractive designs in grilles, parlor columns, colonnade openings, consols and sideboards, each of which is described in a way to eliminate any misunderstanding in ordering goods from the catalog. It is stated that all products are made from strictly kiln-dried lumber and should be filled or varnished immediately on receipt of shipment in order to prevent the wood from swelling. The catalog has 48 pages, the first portion of which is devoted to an extensive line of grilles. Next in order are bookcases, colonnades, consols and sideboards, a number of full-page illustrations giving the reader an excellent conception of the construction and finished appearance. Among other interesting features is a very attractive combination desk and bookcase, the left side housing the bookcase and the right side a desk, with drawers underneath. This combination measures 46 in. high, 42 in. long and columns 10 to 8 in. Electric light posts for interior use are also featured, while on the last two pages are cuts of columns, corner brackets and capitals. Prices are quoted for plain red oak, unselected birch, yellow pine and cypress, not varnished, and the statement is made that quotations for other woods will be sent on application. The catalog should be of value to contractors and builders who are called upon to suggest ideas for interior treatment of houses, bungalows, etc., and a copy may be had free by writing to the address above given.

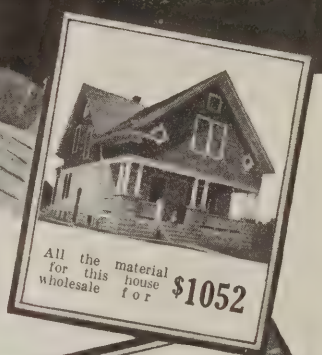
Booklet on Galvanized Sheets

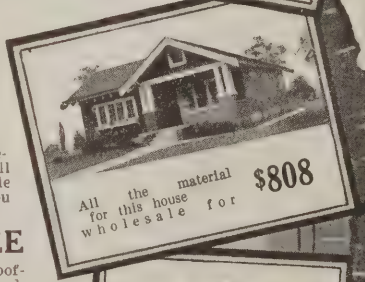
Galvanized sheets that will stand hard service when used as roofing or siding, as well as in the construction of silos, culverts, etc., are growing in favor in

(*Continued on page* 72)

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In Business Half a Century

1987





Sterlings' vs. "Just Wheelbarrows"

Tim Says:—

"I was on earth a considerable number of years before I caught on to the big difference in wheelbarrows.

"Jest naturally thought a wheelbarrow was a wheelbarrow, and the word meant a 'Rotten Bunch of Something,' that got the shakes and quit about every so often, and started a cussin' match between the boss and the fellow who did the wheelin'.

"Most people is the same as I was, and has an idea that a wheelbarrow is jest a box, with a couple of sticks, and a wheel hitched onter it.

"But let me tell you there's a *heap* o' difference, and if you want to know, jest ask for *'Sterlings,'* instead of wheelbarrows, and you will discover that a Sterling is mor'n a common old perambulator, bein' as it is a dern good piece of wheelin' machinery, built to last and stand the hard knocks.

"Why that Sterling even has self oilin' bushin's in the wheels; clamps that keep the handles from breakin'; riveted legs, and a lot of more good things that puts them in a class by themselves.

"And speakin' of 'class,' there's a lot of class to Sterling Wheelbarrows—they look good all over—and they are.

"Wheelbarrows is wheelbarrows alrighty, but Sterlings is different."

—TIM TRUNDLE.

Send for Our Catalog No. 19

Sterling Wheelbarrow Co.

6201 Shenners Avenue, West Allis, Wis.

Makers of Patented Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

many parts of the country, and contractors and builders will therefore find much to interest them in a booklet entitled "Apollo Best Bloom and Apollo-Keystone Copper Steel Galvanized Sheets," which has just been issued by the American Sheet & Tin Plate Co., Frick Building, Pittsburgh, Pa. This booklet is profusely illustrated with half-tone engravings of examples showing the durability of the company's product. There are also tables of weights of Apollo Best Bloom galvanized flat sheets and of Apollo galvanized formed products, etc., the latter giving weights per bundle and per square. Apollo-Keystone copper steel galvanized sheets are said to possess an added degree of durability through the use of an alloy known as "Keystone Copper Steel." The rust-resisting properties of this alloy are said to have been thoroughly established by



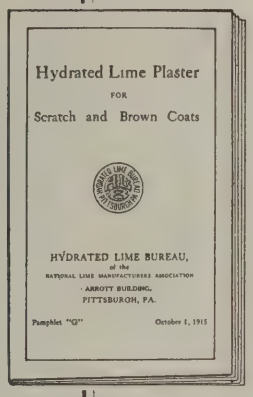
Fig. 7—A Silo Built of "Apollo" Galvanized Sheets

actual service and exposure tests extending over a number of years. Keystone copper steel is therefore used as the base of Apollo-Keystone galvanized, which the company recommends for roofing, siding, tanks, etc. An example of its application in silo construction is shown in Fig. 7.

Ambler Asbestos Shingles

There has just been issued from the press by the Keasbey & Mattison Company, Ambler, Pa., a handsome *brochure*, attractively printed on a good quality of paper, profusely illustrated with well executed halftone engravings and bearing the title, "The Glory That Once Was Paris." In this case the Paris referred to is located in Texas, a thriving city of about 15,000 people, where late in the afternoon of March 21 and before noon of March 22 more than two-thirds of the town, including all of the business portion, had been destroyed by fire. The conflagration covered thirty blocks, and in addition to the business section included about 2000 homes. By a strange coincidence, Augusta, Ga., was visited by a destructive fire during the same twenty-four hours that Paris was ablaze. Here, ten business and twenty residential blocks had been swept by the flames, with a loss in the two cases running into the millions. Some of the halftone pictures show scenes after the conflagration. The lesson to be learned is that the substitution of more enduring and noncombustible material would have prevented the spread of the fires. It is especially pointed out that if asbestos shingles had been used upon the roofs of the houses, the flames would not have made such headway, as there is nothing about these shingles to burn or carry fire. The point is made by the Keasbey & Mattison Company that a shingle made from asbestos fiber and cement becomes tougher, stronger, and more resistant to both fire and weather the longer it is exposed. In addition to the fire scenes

(*Continued on page 74*)



Hydrated Lime Plaster Makes Quiet Homes



For Scratch and Brown Coats

It's the great sound deadener. Will put quiet in the home. Will make a big difference in every house where you use it.

Hydrated Lime Plaster is the ideal plaster for interior walls.

FOR THESE REASONS:

SOUND—The hardened walls contain millions of tiny dead air cells. These absorb sound and reduce reflection and transmission to a minimum. Keeps the noise from being transmitted through the walls from one part of the house to another.

STRAIGHTER WALLS — Hydrated Lime Plaster is a slower setting plaster and in drying gives the plasterers time to finish the walls to true and even surfaces and angles. This slower set also permits the plasterer to eliminate lath cracks.

ECONOMIES—Hydrated Lime has a high sand carrying capacity. (Be sure to get our complete specifications, giving proportions of hydrated lime and sand.) There is no waste of material through droppings. These can all be retempered and used either the same day or the day after.

Hydrated Lime Plaster costs no more than other plaster. Try it on the buildings you are now constructing. It's the perfect plaster for home construction.

Our Bulletin "G" is valuable to wide-awake builders. Send for your copy of "Plaster Facts."

HYDRATED LIME BUREAU
of the
National Lime Manufacturers' Association
1609 Arrott Bldg., Pittsburgh, Pa.



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Gentlemen:

Please send Booklet "G" and complete specifications for H. L. Plaster.

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Let us send you our free books on homes and garages, giving practical information and stucco specifications. We will also send you each month our Contractor's Atlas, a monthly publication containing many valuable business-getting suggestions. Use the coupon below.

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The Atlas Portland Cement Co., 30 Broad St., New York, or Corn Exchange Bank Building, Chicago.
Send me your "Guide to Good Stucco," together with Specifications—also the Contractor's Atlas and special sales information on subjects checked: ☐ New Stucco Homes. ☐ Remodeling in Stucco. ☐ Stucco Garages. ☐ Stucco Bungalows.

Name.....Address.....

the *brochure* in question carries illustrations of a number of very attractive cottages and residences in connection with all of which Ambler asbestos shingles of the "Century" brand have been used. In some cases the side walls, as well as the roofs, have been covered with them.

Book on Plumbing and Heating Materials

An exceptionally valuable work covering plumbing and heating materials and the methods employed in installing them efficiently has been published by the Hardin-Lavin Co., 4538-48 Cottage Grove Avenue, Chicago, Ill., and distributed broadcast throughout the country among contractors and builders. The book contains over 200 pages, and it is profusely illustrated. The company recommends the book as answering the ever-increasing demand for high-grade plumbing and heating supplies at the right prices. It stands ready to supply anything from a fitting to a complete plumbing or heating outfit, and guarantees new and attractive designs of lasting durability, prompt and direct shipments and easy instructions relative to installation. The catalog contains a wide variety of bathroom combinations and accessories, laundry trays, kitchen sinks, lighting fixtures, etc., while the numerous plans, elevations and detail drawings that are presented are sufficient to warrant a place for this volume in the files of the progressive builder.

The "Van Guilder" Building System

Under the above title there has just been issued by the Van Guilder Hollow Wall Co., 712 Chamber of Commerce Building, Rochester, N. Y., an attractive folder of liberal proportions, illustrated by numerous half-tone engravings, and relating to the "Van Guilder" concrete double-wall system of building construction. The point is made that the buildings erected by means of this system are like thermos bottles—a house within a house. In connection with the matter, of special interest to the builder, as well as to the prospective owner, is a table of comparative costs gathered from the use of the double-wall system during the past six years:

Van Guilder double 4-in. walls	10c to 14c per square or surface foot
Frame walls	16c per square or surface foot
Tile walls	19c to 24c per square or surface foot
Tile walls	10c to 24c per square or surface foot
Cement blocks	23c to 25c per square or surface foot

To these figures of cast must be added a fair profit for the contractor. The company states that many appear to have a wrong impression of its business. It does not simply make and furnish machines and equipment for doing the work, but the company maintains a Bureau of Information and Service for the purpose of spreading knowledge and directing the builder how to proceed correctly and economically. The company gathers from hundreds of builders facts and experiences, a single item of which is often of great value to the man doing the work.

Many of the illustrations in the folder relate to buildings which have been erected by the "Van Guilder" system, these embracing barns, dwellings, schoolhouses, etc., etc. Several pages are devoted to the new "Van Guilder" 1916 flexible sliding side plate and angle iron corner system, the illustrations showing the machine and its parts, as well as the work which may be accomplished by their use. They also show a few of the intricate wall-building problems which are constantly arising. Not the least interesting feature of this more than usually interesting folder are the machines for building double-wall silos and those for use in erecting triple walls with two air spaces for concrete cold storage structures and ice houses. Reference is made to the important farm buildings which have been put up by the "Van Guilder" system and to the great satisfaction which it has given wherever introduced.

(Continued on page 76)

CORBIN



BIG VALUE FOR THE MONEY

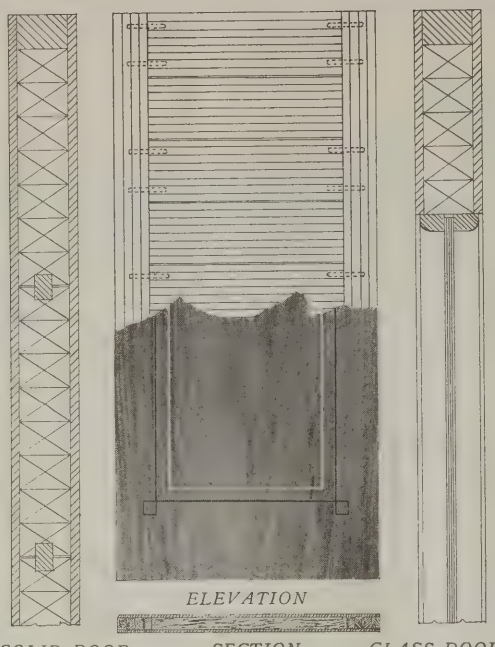
Corbin hardware for moderate-priced houses has the same artistic merit, the same excellence of finish and the same attention to detail as the most expensive. It makes the use of poor hardware inexcusable. Ask your hardware dealer or write us for particulars.

P. & F. CORBIN

The American Hardware Corporation Successor

NEW BRITAIN, CONN.

NEW YORK CHICAGO PHILADELPHIA



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

Manufactured by

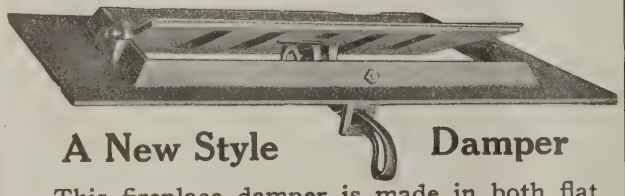
HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

FIREPLACE

MATERIAL



A New Style Damper

This fireplace damper is made in both flat and dome styles. The lever sets under the first row of brick, unexposed, but very accessible and easily operated.

Also made with lower lever so a steel angle can be placed under edge of damper. We make several other style dampers.

Catalog 1590 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

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SEND COUPON TODAY

Stover Mfg. & Eng. Co., 747 East St., Freeport, Ill.

Send the undersigned information regarding your

Name .....

Business .....

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Asphalt Shingles for Railroad Stations

As a result of many years' practical buying experience, railroad companies purchase their goods solely on an efficiency basis. They want long life building materials that give the maximum services for their cost. According to the Asphalt Shingle Publicity Bureau, Old Colony Building, Chicago, Ill., railroads are extensive users of asphalt shingles for the foregoing reasons. The depot at Wequetonsing, Wis., Fig. 8, is covered with asphalt shingles, and no matter how thick the burning sparks may fall on the roof, the asphalt shingles protect the structure. Another important point is that their light weight dispenses with the use of heavy joists or rafters, which would be essential if a heavy



Fig. 8—Asphalt Shingles for Railroad Stations

roof covering was used. The surfacing of crushed rock products, in natural colors, is claimed to shield the shingles against the wearing effects of time and weather, and the colors are said to never fade.

The Stanley Scrap Book of Garage Hardware

One of the latest schemes in promoting the sale of a manufacturer's product is that which has been adopted by the Stanley Works, New Britain, Conn., and which consists in the distribution to the hardware trade of a handsome scrap book entitled "What We Are Doing to Help You Sell More Stanley Garage Hardware." This book in size measures 10 x 14 in. and the frontispiece shows the publications used in the promotion of the Stanley garage hardware advertising campaign. There are illustrations of mounted samples of Stanley garage door holder No. 1774, one being for counter use and the other for the use of traveling salesmen. After this come descriptions of the new Stanley garage hardware catalog for jobbers and hardware dealers, also a special catalog for architects, which is now in preparation. A sample of the covers of this new catalog is pasted on the page facing the description. On the two following pages the signs, display cards, etc., furnished to dealers are illustrated and described, together with the various folders for distribution by hardware dealers. Several pages are given up to information about the various publications used by the company and including, of course, THE BUILDING AGE. There are also a number of pages to which are pasted sample advertisements showing the type of material that is appearing in various trade and class publications.

Further Information Regarding Flex-A-Tile Roll Shingles

Supplementing our reference a short time ago to the new Flex-A-Tile Roll Shingle which has just been placed upon the market by the Heppes Company, 1011 Kilbourne Avenue, Chicago, Ill., it is interesting to state that it is really a regular full size 32-in. wide roll of individual asphalt shingles which when placed give all the attractive appearance of a high-grade asphalt shingle roof combined with the economy of roll roofing, inasmuch as the asphalt shingle effect is said to be obtained with no greater labor cost than with roll roofing. This is something in which the builder and roofing contractor are likely to be interested by reason of the fact that it is well calculated to appeal to the prospective client. Samples of the new Flex-A-Tile

(*Continued on page* 78)



Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

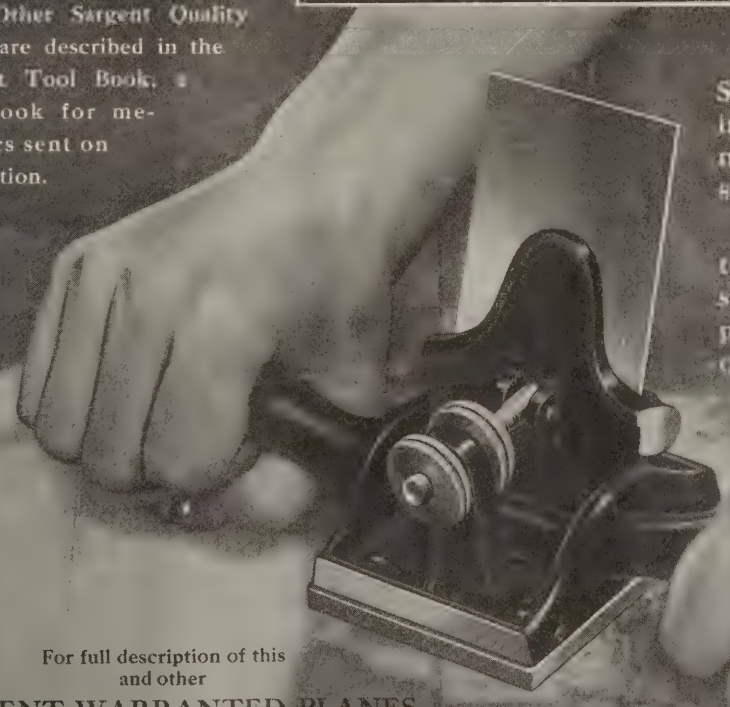
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Occupation.....

City.....State.....

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.



No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.

For full description of this and other

SARGENT WARRANTED PLANES

SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY

Makers of Squares, Planes and Mechanics' Tools

53 Water St. New Haven, Conn.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



TWELVE MEDALS
of award at International Expositions

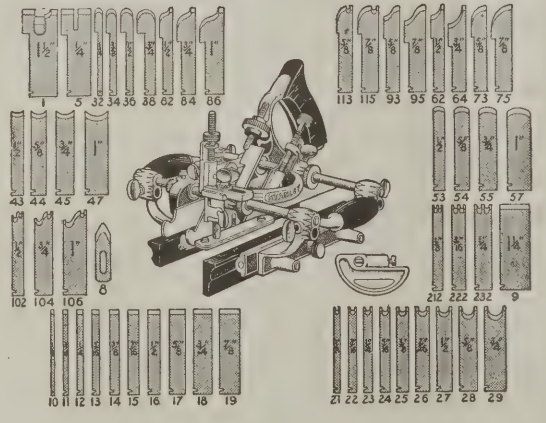
SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.

Owned and Operated by Nicholson File Company

Stanley Tools



Stanley "Fifty-Five" Plane

This Tool, in addition to being a Beading and Center Beading Plane, a Plow, Dado, Rabbet, Filletster, and Match Plane, a Sash Plane and a Slitting Plane, is also a superior Moulding Plane, and will accommodate cutters of almost any shape and size. In fact, it is "A PLANING MILL WITHIN ITSELF."

The regular equipment sent with the Plane comprises fifty-two cutters, all of which are shown in the cut.

A further line of forty-one cutters is carried in stock. Cutters of practically any form can be used in the Plane, which the owner can make from blanks or order from sketch.

We would welcome an opportunity of sending you without charge our book "'55' Plane and How to Use It."
You will find it interesting. Address

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Roll Shingle can be obtained on application to the company at the address stated.

Modern Lighting Fixtures

In view of the attention which is being given at the present time to modern lighting fixtures for residences and other buildings, unusual interest attaches to the handsome catalog of 184 pages, relating to goods of this character, which has just been issued by the New York Gas & Electric Appliance Company, 569 and 571 Broadway, New York City. The publication is known as "Catalog No. 18," and its contents are copyrighted. It illustrates an extensive line of gas, electric and combination fixtures, brackets, pendants, domes, portables, electroliers, indirect and semi-indirect lighting fixtures for commercial as well as for residential purposes, electrical appliances, gas goods, glassware and general supplies. The catalog measures 11 x 8¾ in. in size, thus permitting the use of a number of illustrations to the page. The early portion of the catalog shows extensive lines of electric showers finished in a great variety of effects and constituting noticeable features of the interior fittings of a room. The line of Craftsman wrought-iron fixtures is also a striking feature of the catalog. There are several pages showing fixtures printed in colors, thus affording the prospective purchaser an idea of the actual appearance of the finished goods. The designs relate to fixtures for gas as well as electric lighting, and the assortment shown cannot fail to prove exceedingly interesting to prospective purchasers. At the close of the catalog is an alphabetical and a numerical index, thus greatly facilitating reference to any design required.

Specifications for Installation of Stewart Furnaces

For the purpose of facilitating the installation of Stewart furnaces, Fuller & Warren, Troy, N. Y., are furnishing specifications and sketch blank which are to be filled out by those desiring information as to size, style and price of the furnaces for heating a certain building, also size and location of warm-air pipes, registers, etc. The company points out that the more care the person takes in answering the questions enumerated and making the sketches the more accurate will be the plans submitted. There are two sheets of tracing paper for the purpose of making a tracing of the basement and second-floor plans, also a page which is to be used for making a plan of the first floor, this being drawn with squares, each of which represents 1 sq. ft. The shape and size of each room are to be clearly indicated, also the location of partitions, windows, doors, chimney, etc. On the last page are shown plans of the basement, first floor and second floor of a building, with the heating and ventilating equipment clearly indicated. Messrs. Fuller & Warren state that their heating and ventilating department is ready to consult with prospective clients regarding their problems and proper plans and specifications for the most approved and economical method of heating and ventilating any work they may have for it. For such service no charge is made.

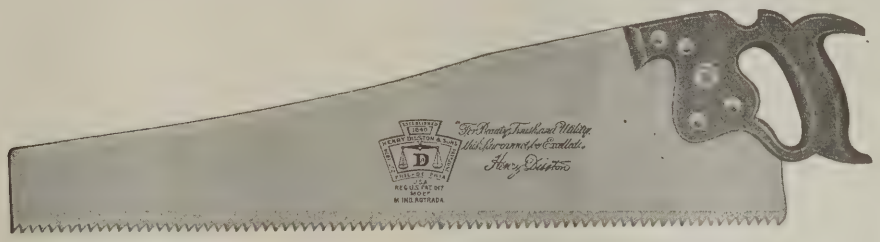
The New Speakman-Stratton Mixing Valve

It is generally recognized that there are few questions at the present day which are being given greater consideration in the business world than those of efficiency and standardization. By the business world is meant not only manufacturing and selling, but also the professional man as well. The architect, for instance, is sure to find himself involved by the changes and new methods which these questions bring about. His filing cabinets are standardized and brought to higher efficiency for him by the cabinet makers. The materials with which he works are standardized. His business in all lines in so far as it concerns the material object with which he deals is tending in the same direction. The present desire to carry standardization and efficiency principles into effect is well illustrated by the new mixing valve now being placed upon the market by the Speakman Supply and Pipe Company, Wilmington, Del., and a general view of which is presented in Fig. 9. It appears that some time ago W. B.

(*Continued on page* 80)

A Good Mechanic Can Do a Job With Any Tool, But —

—not so well—not so quickly—not so easily as he can with a good tool



DISSTON SAWS

are the saws for the good mechanic because a skilled mechanic takes a pride in his work and in his tools. It's a satisfaction to own and work with a Disston Saw.

Booklet of Sharpening Instructions, Free

HENRY DISSTON & SONS, Inc., Philadelphia, U.S.A.

A Sensible, Safe Construction

We've been at your service for the past twenty-seven years, and we believe by working with architects and contractors on thousands of Store Fronts—of practically every type—we are competent to co-operate with you.

Almetal STORE FRONTS

During the wonderful development of Store Fronts we've never attempted to market a "freak" construction — we've "kept both feet on the ground," with the result of a universal confidence in our products.

"ALMETAL" construction is our latest achievement. It's born of experience—practical, simple, easy to install, efficient and moderate in price.

The heavy-gauge copper and the creosote-dipped blocks insure permanency and safety to glass. Show-window ventilation is also well provided for.

If you haven't "ALMETAL" details on file, we'll gladly send a set. A card will do—no obligation.

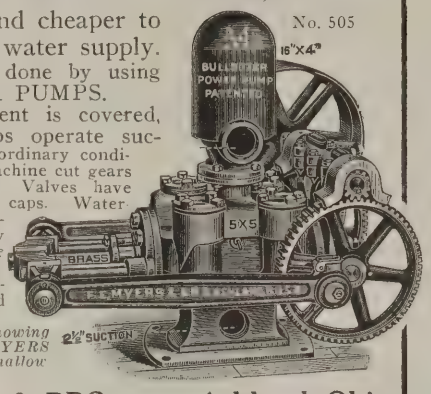
DETROIT SHOW CASE CO.
(We also make the well-known Petz construction)
483 W. Fort Street **Detroit, Mich.**



MYERS POWER PUMPS Many Kinds Many Sizes

It is better and cheaper to have your own water supply. It can easily be done by using MYERS POWER PUMPS.

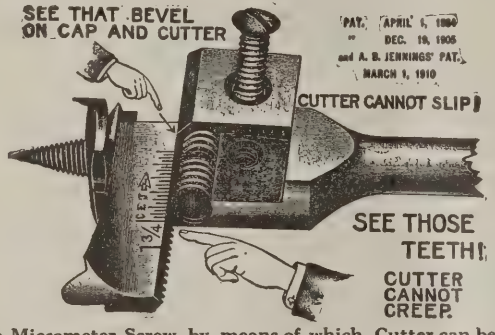
Every requirement is covered, and Myers Pumps operate successfully under extraordinary conditions. The double machine cut gears prevent side strain. Valves have individual removable caps. Waterways are large, permitting a free, easy flow. Tight and loose pulleys are furnished Easy to install, economical to operate and satisfactory always.



Write for catalog showing many styles of MYERS POWER PUMPS for shallow and deep wells.

F. E. MYERS & BRO. Ashland, Ohio
ASHLAND PUMP AND HAY TOOL WORKS

C. E. JENNINGS STEERS PATENT **EXPANSIVE BIT**



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. *Sole Mfrs.* 71-73 Murray St., N. Y.

The word "WHALEBONE" before Wall Ties means a permanent construction when placed.

Don't order Wall Ties from your dealer. Order Whalebone Wall Ties and get the best.



Standard size for solid or veneer walls 7 x ⅞", weighing 50 pounds to the thousand.

If your dealer can't furnish "Whalebone," wire us at our expense the following:

(Name of dealer) can't furnish Whalebone, (Express, Freight) (number) boxes. (Your name).

We will ship the same day from our factory or from the nearest dealer handling the Whalebone and guarantee satisfaction in every respect.

Allegheny Steel Band Co., 886-888 Progress St. Pittsburgh, Pa.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, acauat load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

Stratton, a Detroit architect, found it necessary to specify mixing valves for the use of surgeons in the Detroit General Hospital. There were a number of mixing valves of American make as well as some of foreign design from which a choice could be made; he arranged a series of tests to determine which was best adapted to the work. There were eight different valves, three of them foreign made, which were compared as to the following requirements: 1st, perfect control and grading of full range of temperature; 2nd, ease of cleaning the fixtures; 3rd, minimum liability of the fixtures getting out of order, and 4th, simplicity of parts and ease of repairs. The result of this test was the evolution of a new design based on the mechanical con-



Fig. 9—The New Speakman-Stratton Mixing Valve

struction of the Speakman valve—one of those used in the test. It is this new standardized design that is now being placed on the market under the name of Speakman-Stratton mixing valve. The interior construction of the valve is very simple, the only working parts being the cylindrical mixing chamber and the spindles. The latter, with washers, close with the pressure, while the cylindrical chamber acts as a cam to open the discs. The exact regulation or measurement of water is insured by the port openings in the cylinder traveling across the openings of the water supply. The statement is made that the mixing of water is such that a thermometer placed in the jet shows a regular gradual rise in temperature as the lever handle attached to the valve is swung. This valve is said to mark a decided step in the advance of the standardization of hospital appliances.

Keystona Flat Finish

A handsomely printed pamphlet of sixteen pages illustrated with numerous interior views in colors of delicate hue and relating to the merits of Keystona flat finish which it is claimed "goes on like paint, looks like wall paper and can be washed if desired," has been issued by the Keystone Varnish Company, 2010 Keystona Building, Brooklyn, N. Y. Within the covers of the work the statement is made that Keystona is a washable linseed oil paint for all interior painting that dries without a gloss. Where this flat finish is used the claim is made that walls may be washed and cleaned with soap and water just the same as windows and floors. It is said to be easy to apply, is germ and vermin proof, and retains its color permanently. It can be applied over woodwork as a finish, as an under-coating for enamel, a ground work for staining, glazing and graining, and on metal ceilings, wallpaper, burlap, canvas and galvanized iron. A double page in the center of the booklet carries thirty examples in colors of the various tints which can be produced. Six of these are intended for ceilings, twelve for walls of bed rooms,

(*Continued on page 82*)

This Kellastone Stucco Was Applied in Freezing Weather

IT'S simply this: that *Kellastone* is the only stucco in existence that can be successfully applied in cold, freezing weather with the absolute assurance that it will not crack, fall or break off. Kellastone is immune to expansion and contraction due to temperature changes. Whatever the temperature, the perfect result is the same. This is because it is mixed with a chemical solution, instead of water.

KELLASTONE
IMPERISHABLE STUCCO

It is not affected by the normal settling of walls. It bonds perfectly with stone, wood, tile, brick or other building material. There'll be no cracks or breaks around door and window casings.

Kellastone overcomes normal stresses, defies climate, moisture, rain, fire and the lapse of time, and preserves its new appearance for years. It may be applied in all of the finishes obtainable with any other stucco, and, in addition, it is the only stucco that can be successfully dry dashed—producing granite and marble effects.

Kellastone is used by the U. S. Govt., and on big buildings, hospitals, schools, railroads, and finest homes everywhere.

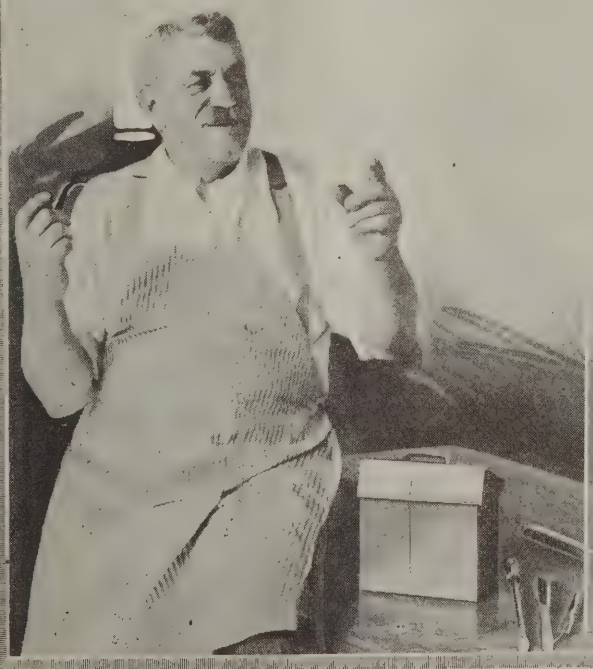


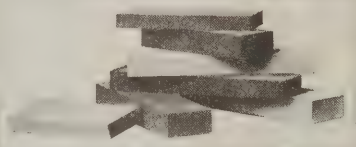
Kellastone Composition Flooring solves the flooring problem. It has no seams, cracks or joints, deadens sound and wears indefinitely. Superior to concrete, tile, wood or other flooring. Used in factories, shops, schools, public buildings, homes.

You ought to know more about wonderful Kellastone. Write today.

The National Kellastone Co., 506 Association Bldg., Chicago, Ill.

Pete Says:
"There's as Much Difference in Sharpening Stones as there is in Tools."





THERE are some tools that fall down on the job, there are others that give service—it's the same with sharpening stones, there are some that merely rub the edge on the tool, that fill and won't hold their shape and then there are

Carborundum Sharpening Stones

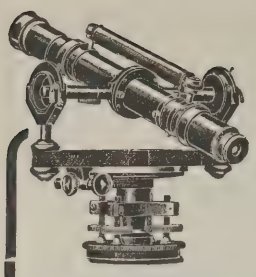
Clean and quick-cutting, positively uniform and they won't glaze if properly used. They hold their shape, show long life, always ready for work.

There is nothing harder, sharper or faster-cutting than Carborundum

Your hardware dealer can supply you or order direct

.....

The Carborundum Company
Niagara Falls, N. Y.



"KOLESCH"
TILTING LEVEL

is designed especially for Builders in leveling walls, laying out angles, grading streets, sewers, drains, sidewalks, etc.

Complete in polished box with plumb bob, adjusting pins, metal trivet, book of instructions, and tripod. $57.50

You can save its cost on a single job by avoiding expensive mistakes

Kolesch & Co., 138 Fulton St. NEW YORK

Make a buying as well as a building profit

Order *now* your lumber for late Fall and early Spring jobs. The H-L-F low off-season price on quality lumber, direct to you, will mean hundreds of dollars lumber saved—hundreds of dollars extra profit. Send material bills for prices. Send 10 cents for $1.00 Plan Book; 4 cents for Barn Book. Millwork catalog free. Write *quick*.

Hewitt-Lea-Funck Co.
1559 H-L-F Building Sumner, Wash.

LUMBER



FOUR NAILS at PRICE OF ONE
When You Buy Them

ONE NAIL in place of FOUR
When You Drive Them

Trade SIMPLEX Mark
Reg. U. S. Pat. Office

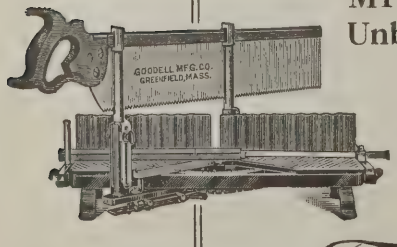
ROOFING NAILS

BECAUSE the Simplex has four times the head area of an ordinary roofing nail—hence four times the holding power, as head area is the all-important point in laying repared roofing or sheathing papers.

Demand Simplex Nails from your hardware dealer. Don't buy prepared roofing unless Simplex Nails are packed in the rolls. FREE samples sent on receipt of request accompanied by dealer's name.

H. B. Sherman Mfg. Co., Battle Creek, Mich.

GOODELL PRATT
1500 GOOD TOOLS



ALL-STEEL
MITRE BOX
Unbreakable

Many Special Features
Circular Free to You
Goodell-Pratt Company

Toolsmiths

Greenfield Mass., U. S. A.

and twelve for walls of dining rooms, libraries, halls, stairways, etc.

Folder Illustrating Smith Mixerette Concrete Mixer

The T. L. Smith Company, 3120-X Hadley Street, Milwaukee, Wis., has just gotten out an attractive folder illustrating all possible combinations of the Smith Mixerette—the smallest of the line of Smith concrete mixers. This machine has a capacity of 3 cu. ft. of mixed concrete per batch, or approximately 5 cu. yd. of mixed concrete per hour. The possible combinations of the machine include the Mixerette equipped with either power charger, gated batch hopper or 16-in. low-charging platform; also the Mixerette with hoist mounted on truck between engine and mixer drum. This last combination is referred to as a most excellent little rig for either the building-contractor for hoisting his concrete, brick, mortar, etc., or for the silo builder in erecting silos.

Kahn Road Book

The Trussed Concrete Steel Company, Youngstown, Ohio, is sending out an attractively printed and illustrated publication of 128 pages, entitled "Kahn Road Book." It is devoted to concrete roads and pavements, and refers to Kahn mesh for reinforcement, Kahn armor plates for joints, curb bars and edge protectors, etc., etc The illustrations are numerous, consisting for the most part of halftone engravings.

The Fine Art of Enameling

An interesting book which deals with the art of enameling has recently been published by the Kohler Company of Kohler, Wis. Few people have any idea of the process of enameling the iron castings of bath tubs, lavatories and sinks, and fewer still know anything about the history of enameling.



This interesting book, entitled "Kohler of Kohler," traces briefly the progress of enameling from the time of the early Phoenicians down to the present perfected method employed in the great Kohler plant. The book is profusely illustrated, the color plates showing the construction of a bath tub from the time the pig iron is lifted by the electric magnet, through the various stages of its completion until it is ready for shipment. To anyone who has never been in such a factory as that of the Kohler Company the description and illustrations of the casting, enameling, etc., will be most interesting. Those, too, who are informed concerning the art of enameling will find the book well worthy of perusal. In addition to the interesting story of the development of enameling the book contains a comprehensive catalog of Kohler products. It is sent free to those who write for it.

TRADE NOTES

Federal trucks played a conspicuous part in the recent mobilization of the various National Guard units throughout the country. In New York City, for instance, the Seventh Regiment was presented with nine Federal trucks, purchased by the veterans of the regiment. The trucks were used to deliver transport army stores and equipment from the armory to Jersey City.

H. W. Johns-Manville Co., with Minneapolis office at 18 Eighth Street, South, made an exhibit of asbestos products at the recent annual convention held in that city by the National Association of Stationary Engineers.

The usual quota of interesting information relative to products manufactured by the Richards-Wilcox Mfg. Co., Aurora, Ill., is contained in the September issue of *Doorways*. In addition, there is a clever editorial on "The Honor Standard—Reputation," which states

(*Continued on page* 84)

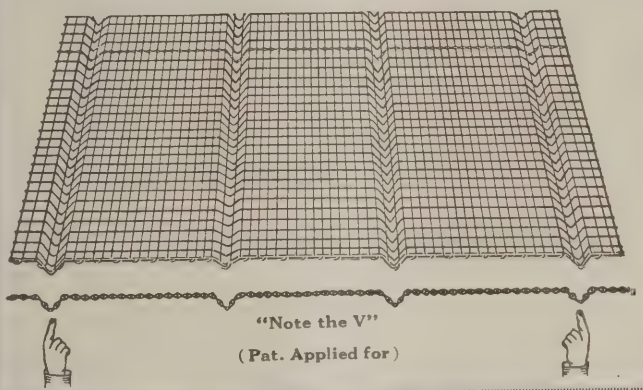
Contractors, Builders, Carpenters!

Why shouldn't *you* get the profit on Ready-Cut Houses erected in your locality? Permanent Ready-Cut Houses are growing in popularity all the time. More and more people are buying them. There are 10 persons in every locality who would be interested in a Ready-Cut House to one who might *build* a house. You might as well get the profit. If you don't, some mail order house will.

I have a very special proposition to offer to you. Will you write?

E. R. MORRIS, 1321 Peoples Gas Building, CHICAGO, ILL.

Grimm's Galvanized Corrugated Wire Lathing



requires no furring on account of the V-shaped corrugations which are imbedded at intervals of seven inches.

This feature alone is worth considering but that's not all. It WILL NOT RUST as it is heavily galvanized with the finest grade of Western Spelter and is much easier to handle and will conform to irregular curves much better than any other form of metal or wood lath.

Walls or ceilings plastered on this lathing WILL NOT CRACK OR DROP OFF, owing to its great keying qualities, which we will explain if you will drop us a card asking for our booklet No. 61 and samples.

We also manufacture Greening's Patent Trussed Steel Wire Lathing, "Buffalo" Crimped Wire Concrete Reinforcing, "Buffalo" Wire Cloth of all kinds and Wire and Artistic Metal Work for all purposes. DROP US A LINE AT ONCE and ask for Catalog 8-H.

BUFFALO WIRE WORKS CO.
(Formerly Scheeler's Sons)
MAIN OFFICE AND FACTORY, 446 TERRACE, BUFFALO, N. Y.
Branch Office and Warehouse, 9-11 South 7th St., Philadelphia, Pa.



YANKEE No. 135

Send for the YANKEE Book A Postal Brings It

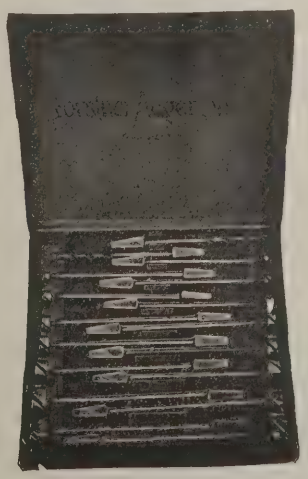
A NEW "YANKEE" TOOL for smaller screws. A quick and convenient driver for carpenters, cabinet makers, electricians and all mechanics who frequently have a large number of small screws to drive. The spring in the handle drives it back quickly for the next thrust and holds it extended, making it a very excellent tool for overhead work or in tight places where other screw drivers will not reach. Your dealer will supply you.

NORTH BROS. MFG. CO.
Lehigh Avenue Philadelphia, Pa.



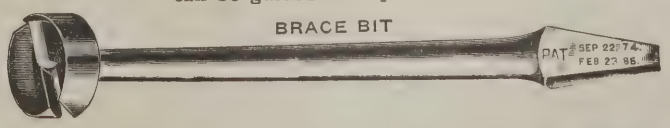
YANKEE No. 135

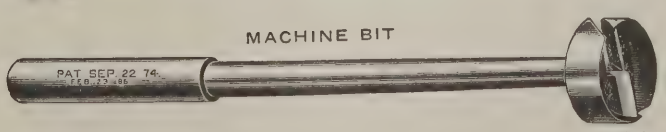
Send for the YANKEE Book A Postal Brings It



THE "FORSTNER" LABOR SAVING AUGER BIT
BORES ANY ARC OF A CIRCLE

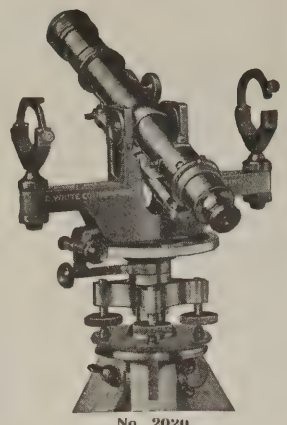
As it is guided by its circular rim instead of its center, and can be guided in any direction.





Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.



No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.

Pullman

ALL STEEL **Unit Sash Balances**



Noiseless

Is the word that describes the operation of the Pullman Unit Sash Balance. All parts are in the casing—nothing can rub or interfere with the spring action. There is nothing to squeak, rattle, bang or stick. Once installed and it will never require contractors', builders' or architects' attention. There is in every Pullman Sash Balance satisfaction for owner and builder alike. Guaranteed for 10 years.

Our catalog with blue print gives full particulars. May we send one?

Pullman Mfg. Co., 8 Industrial Street Rochester, N. Y.

COPPER CABLE SASH CHAIN



Thomas Morton

245 Centre Street
NEW YORK

Copper Cable
Steel Cable
Champion Metal
Steel Champion

SASH CHAINS

CHAINS

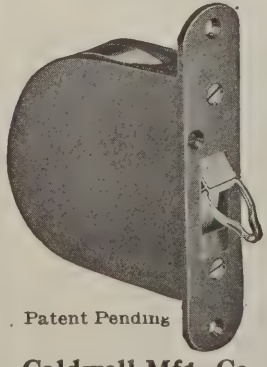
For Suspending Heavy Doors Gates, Etc

All of SUPERIOR QUALITY



CHAMPION METAL SASH CHAIN

CALDWELL SASH BALANCES UNIFORM MORTISES



Patent Pending

For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for circular

Caldwell Mfg. Co., 5 Jones St., Rochester, N. Y.

very strongly the advisability of buying only products of known reputation and value.

Richard W. Proctor, son of the proprietor of Buck Brothers, edge tool manufacturers, Millbury, Mass., died at his father's summer home at Falmouth Heights, Mass., on Aug. 20 after a brief illness. Mr. Proctor associated himself with his father about eleven years ago and had advanced by strict attention to business to be superintendent and manager. He was well known to the hardware trade, especially in New York City, where he visited several times a year.

The sixth anniversary of the Federal Motor Truck Company was announced in the last issue of the *Federal Traffic News*. This publication is mailed free to any contracting builder interested in motor trucks. The striking feature of this publication is the rotogravure section, which appears as an insert in this issue. This is said to be the first rotogravure section ever published by any truck company. It is a pictoral section, showing fifty or sixty Federal trucks in action, typical scenes, such as one would see in the supplement of his Sunday newspaper.

Keasbey & Mattison Co., Ambler, Pa., and with Minneapolis office at 427 Washington Avenue, North, made a display of Ambler asbestos roll fiber felt at the recent convention of the National Association of Stationary Engineers held in Minneapolis.

John A. Berger, one of the founders of the Berger Mfg. Company, Canton, Ohio, maker of sheet metal building products, died Sept. 8 at the age of 69 years. He retired from actual business several years ago.

The many merits of oak flooring are set forth in an attractive folder being sent out by the Oak Flooring Bureau, 1349 Conway Bldg., Chicago, Ill. An interesting testimonial as to the added value of oak over an inferior flooring is given in the statement that of two sister houses, side by side in Chicago, the one with oak flooring sold for $2,000 more than the other.

Elimination of friction in the bearings of a motor vehicle is very important, and the contractor or builder who uses one in connection with his business will therefore be interested in the following item taken from *Graphite*. Hauling hot asphalt is not an easy job even for a five-ton truck, and for about a year a fleet of fourteen such trucks averaged one broken wheel bearing per week. In September, 1914, it was decided to use Dixon's graphite, made by the Joseph Dixon Crucible Company, Jersey City, N. J., mixed with grease. Since that time it is said that not one broken bearing has been reported, which is an excellent testimonial of the value of this lubricant.

The International Roofing Mfg. Company, 5301 South Western Avenue, Chicago, Ill., will erect a one-story warehouse, 66 x 200 ft., to be built of combination tile and concrete slabs. Trusses made by McKeown Bros., of Chicago, will be used and the roof covered with prepared roofing. The cost will be about $16,000 and bids are being received by Engineer N. Ronneberg and Architect R. G. Pierce, Otis Building, Chicago, Ill.

The Wheeling Corrugating Company, Wheeling, W. Va., is preparing plans for a large garage in Chicago to be built next to its new plant at Campbell and Arthington Streets. The garage will contain the latest equipment for the handling of industrial automobile shipping. It will accommodate some of the largest built trucks and is entirely in keeping with the rapidly growing business of the company's Chicago branch. The building will cost $50,000 and is designed by Paul Gerhardt, architect, Chicago, Ill.

The Pecora Paint Co., Fifth and Venango Streets, Philadelphia, Pa., is sending out a series of pamphlets of interest to the builder, and entitled "Pecora Mortar Stains," "Pecora Blue Black Cement Stain," "Pecora Calking and Elastic Glazing Compound," and "Pecora Weathertite Elastic Cement." The last named booklet is especially interesting to the practical builder as it describes various unusual tests to which "Pecora Cement" has been subjected.



The Building Age

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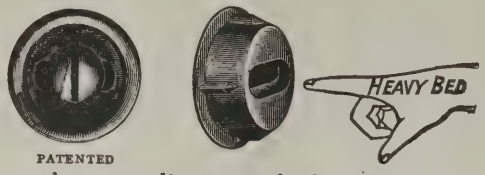
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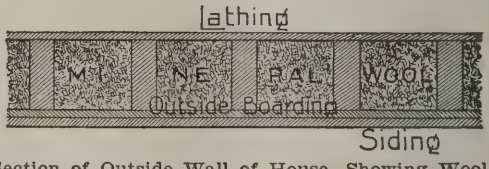
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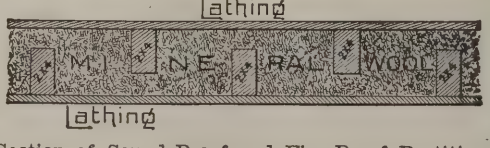
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BUILDING AGE

NEW YORK, NOVEMBER, 1916



FRONT VIEW OF THE HORSE BARN ON EDELLYN FARM NEAR WAUKEGAN, ILL.

A GROUP OF MODERN FARM BUILDINGS

THE ARCHITECTURE, CONVENIENCE, LIGHTING AND SANITATION ARE FEATURES OF THESE STRUCTURES

THE contractor and builder who is called upon to design and erect a number of buildings for farm use finds it necessary to include many important points from the standpoint of construction and grouping, with due consideration to the landscape architecture. Modern practice is to arrange buildings convenient to each other and far enough apart to prevent the spread of fire, in which connection prevailing winds are considered. The structures utilized for housing live stock are designed and located with reference to feed supply, while capacity for present needs and the possibility of future expansion are matters which call for an intelligent analysis of the general situation. Sanitary construction, with adequate provisions for lighting and ventilation, are most essential, for clean buildings and plenty of sunshine and air mean healthy stock. Water supply and drainage are factors which cannot be overlooked, while the question of electric lighting for all buildings is made possible by inexpensive equipment, especially suitable for farm use. Not every farmer is able to afford buildings of concrete or tile, but the cost of farm improvements may be kept within a reasonable figure where a substantial and harmonious combination of wood and fireproof materials is carried out.

An excellent example of a modern farm where all of the foregoing features have been incorporated is found in Edellyn Farm, near Waukegan, Ill. Each building is designed in accordance with its present and future requirements, and exposures are such that prevailing winds and the individual needs of the structure are carefully considered. The result is a grouping that is compact and of exceptionally pleasing appearance. The accompanying farm plan shows the location of the various buildings and their proximity to each other, while the photographic reproductions demonstrate that there is a distinct similarity in the architectural treatment.

Generally speaking, the construction throughout is

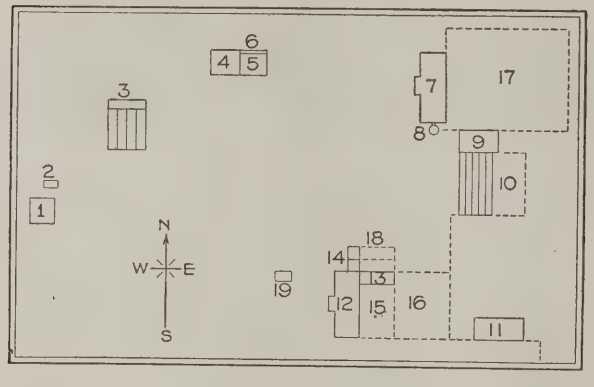


LEFT TO RIGHT—HORSE BARN, GARAGE, MACHINERY AND TOOL SHED AT LEFT OF SILO, CATTLE FEEDING BARN AND PIGGERY. POULTRY HOUSE IS HIDDEN BY THE TREES



THE ABOVE IS A SOUTH VIEW OF THE HORSE BARN AND COLT SHED. AT THE EXTREME RIGHT IS THE GARAGE

free from unnecessary posts and structural members that would tend to interfere with the convenient and economical handling of farm products and stock. All roofs and walls of buildings are shingled, the former being dipped a dark shade of green and the latter finished in white, a combination which is harmonious and effective. The roof lines are enhanced by the dormer windows and red brick chimneys, while the doubling of every fifth course of shingles and extension of all rafters at the eaves demonstrate the thought which was given to the architecture throughout. All roof shingles



1. Farmhouse. 2. Creamery. 3. Poultry House. 4. Machinery Shed. 5. Wagon Shed. 6. Corn Crib. 7. Cattle Feeding Barn. 8. Silo. 9. Piggery. 10. Feed Floor. 11. Garage. 12. Horse Barn. 13. Feeding Barn. 14. Extra Box Stalls. 15, 16, 17, 18. Yards. 19. Pump House.

BLOCK PLAN OF THE FARM BUILDINGS

are exposed 5 in. to the weather and wall shingles 11 in. to the weather. Concrete is used exclusively for footings and mostly for floors, though in some instances creosoted blocks and clay floors have been considered more desirable for the conditions under which they are used.

The group consists of a horse barn with a feeding shed running at right angles, cattle feeding barn with adjacent silo and tank, piggery, poultry house, a combination implement and wagon shed and corn crib, milk house, pump house, garage and farm house. Hay mows are provided over the horse barn, feeding shed and cattle-feeding barn, while the latter has also a weighing room.

The farm house is to be found at the extreme west end of the group, but a few steps from the milk house and a short distance from the poultry house, both buildings being very convenient to the residence. The implement and wagon shed lies to the northeast of the poultry house and is directly in line with the end of the cattle-feeding barn on the northeast corner. At the south end of the latter is a silo and tank, the barn opening to a large concrete yard on the east side. The piggery is 20 yds. east of the silo and faces south, the runs and feed floor extending in this direction. The garage occupies the southeast corner of the group, to the west of which is the horse barn and feeding shed, with yards, as shown. The pump house is between the residence and the horse barn but nearer the latter and has a door on its west side. On the north side of the horse barn are two additional box stalls connecting with individual yards.

DETAILS OF THE HORSE BARN

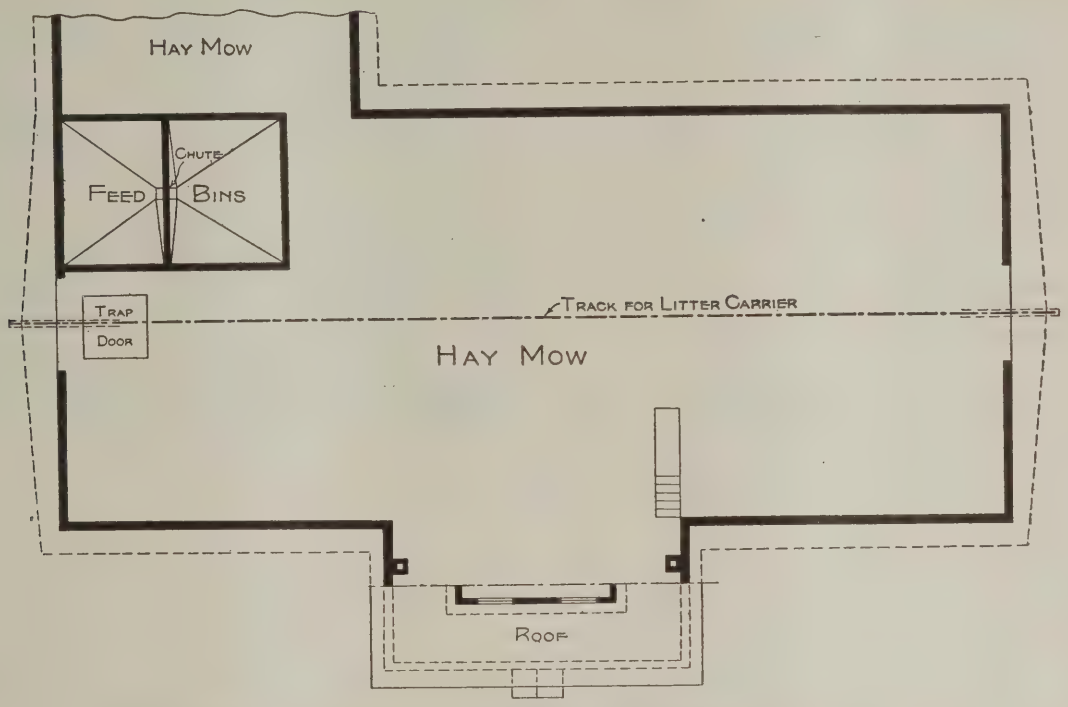
The horse barn has a standard width of 36 ft. and is 80 ft. long, the height from the finished floor to the ridge being 38 ft. The building has three entrances, two at either end for the stock and a canopied entrance on the west front, giving access to a passage with rooms on either side. The first floor presents an arrangement of two rows of stalls, running lengthwise of the barn, a feature which enables the two rows to be attended at once in caring for the stock. On the east side are five box stalls, equipped with sliding doors off the alley and half doors to the yard. On the opposite side are two groups of five single stalls, without doors. The box stalls are 12 ft. square and the single stalls 9 ft. long and 5 ft. wide, with 5 ft. partitions 6 in. thick throughout. Each stall is equipped with a 16 x 24-in. feed box, 8 in. deep. Each stall has a large window installed near the partition at a convenient height, opening inward.

The floor plan includes a 10 x 12 ft. harness room, equipped with brackets for harnesses on three sides, and also a sink. A concrete watering trough, 4 ft. long and 2 ft. wide, rests on concrete slabs 18 in. from the floor. In the northeast corner is a feed room, with sliding door having three chutes from the second floor, a passage between this room and the end box stall leading to the feeding shed. This shed is 26 ft. wide and runs to the east for a distance of 57 ft., feed troughs and a concrete watering trough being built as shown on the accompanying drawings. The shed has two openings to the south, communicating with the yard back of the box stalls. The first-floor plan

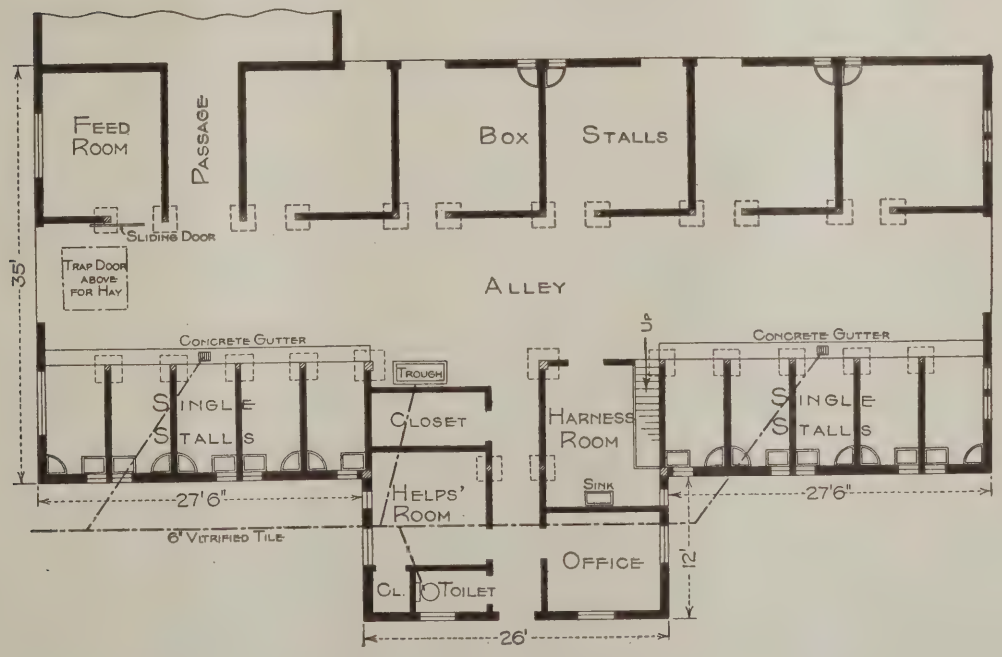
also provides an 8 x 10 ft. office, a small toilet room, a large help room with a closet and a separate large general closet. Living quarters are well lighted and stoves are provided for use in the colder months, proper connections being made with the chimneys which extend through the west roof on either side of the dormer.

A narrow stairway beside the harness room leads to the second floor. At the top of the stairs is the first floor are two large bins. The hay mow over the feeding shed runs at right angles to the barn mow, each mow being equipped with a track and hay carrier which terminates at the ends of the buildings over hay doors. A trap door is provided near the bins so that hay may be dropped to the first floor.

The foundation walls are of concrete 12 in. thick at the base and are tapered to 8 in. at the top,



Second Story Plan Showing Feed Bins and Hay Mow—Scale 1/16 In. to the Foot

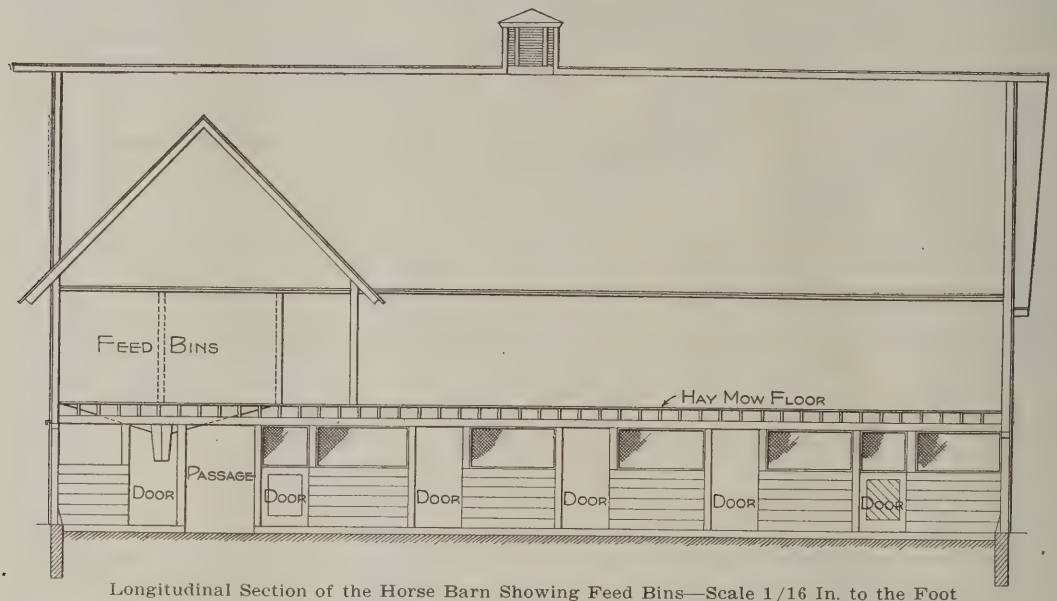


First Floor Plan of Horse Barn on Edellyn Farm—Scale 1/16 In. to the Foot

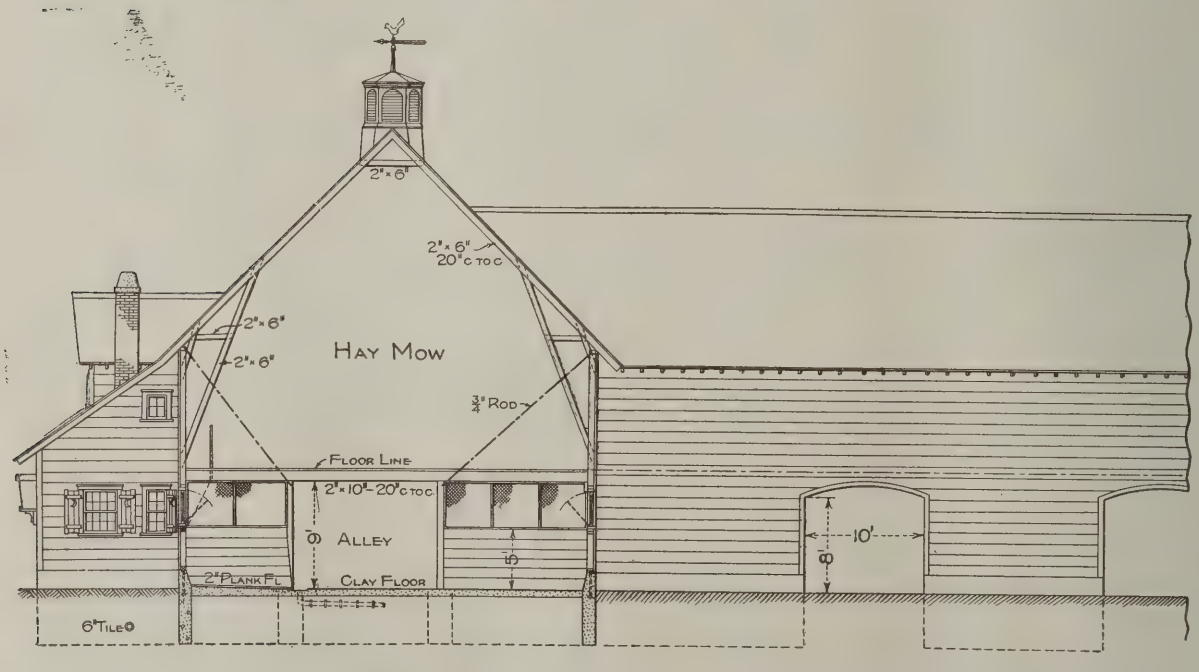
a room lighted by the dormer windows, the chimneys running exposed at this point on their way through the roof. The entire second floor houses the hay mow, while directly over the feed room on the walls extending to a height of 18 in. above grade. Outside walls are 8 in. thick throughout. The alley running the length of the barn is topped off with creosoted blocks, while the floors in the

harness and feed rooms are of concrete. The box stalls have clay floors while those in the single stalls are covered with 2-in. planks. Floor drains are provided where necessary and wastes discharged from the building through 6-in. tile drains.

The construction represents a popular system of plank framing, a type of work which is simple and offers a maximum of mow space, and is economical in the use of building materials. On top of the concrete walls are double 2 x 6-in. plates, securely bolted in place by half-inch bolts spaced 5 ft. apart. The studding and sills are 2 x 6 in., the latter being doubled. On the first floor are 6 x 6-in. posts at the end of each stall partition, supporting 8 x 12-in. girders, on top of which are 2 x 10-in. floor joists spaced 2 ft. on centers throughout the length of the barn. The rafters are 2 x 6 in. spaced 20 in. on centers and collar beams of the same material are provided for each set of rafters. Double plates are provided on top of the studding and ¾-in. tie rods strung to the girders. Every fifth rafter is braced with a 2 x 6 on either side of the rafter, 14 ft. lengths being securely nailed to the rafters and studs. At points shown on the sectional drawing of the barn framing the brace is reinforced by short lengths of 2 x 6's, one piece being inserted between the two 14-ft. lengths and securely nailed to the rafter and main brace. The studs are covered with drop siding and the rafters with regular roof sheathing, the joints of the latter being broken. The hay mow floor is finished with ⅞-in. dressed and matched boards.



Longitudinal Section of the Horse Barn Showing Feed Bins—Scale 1/16 In. to the Foot



Vertical Cross Section of Horse Barn and Partial Elevation of Feeding Shed—Scale 1/16 In. to the Foot

The cattle-feeding barn is practically the same size as the horse barn and of the same shape, being 32 ft. wide, 81 ft. 4 in. long and 34 ft. high. The



HAY MOW OVER HORSE FEEDING SHED

same type of framing has been adopted as in the horse barn with some exceptions in connection with the material used for structural members. The drawings show an entirely different first-floor plan, windows being provided only on the west side, or front, and the south side of the building.

Practically the entire first floor is of the open-type feed barn, communicating on the east side with a large concrete yard through six large openings without doors. Two sides of the barn are equipped with feed troughs which are filled from the second floor through openings near the walls. The barn communicates with a weighing room which is centrally located and extends to the west of the main building. Between the barn and the weighing room are two sliding doors. The weighing room also has two large hinged doors on its north and south sides and a door of ordinary dimensions on the west front, where the scale is operated. At the south end of the building off the open shed is a sliding door leading to a section housing two feed rooms and an alley through the silo. The feed room in the southwest corner accommodates three stanchions, the room being well lighted by four windows, two on each wall. A stairway opposite the stanchions leads to the hay mow. Adjacent to the building on its south end is a 180-ton silo built of hollow tile, with a 10,000 gal. tank on top.

The first floor throughout the building is of concrete, the only exception to this rule being in the feed room back of the stanchions where the cattle stand on creosoted blocks. At this point a concrete gulley has been built, 14 in. wide and 6 in. deep and pitched to a floor drain. The floor rests on a 4-in. bed of cinders and the proportions of concrete are 1:3:5, consisting of one part Atlas Portland cement, three parts washed torpedo sand and five parts washed gravel. The footings and walls are of concrete 12 in. thick, the walls being tapered to a height of 18 in. above grade.

The second floor is partially supported by five posts lining the center of the barn and a like number on the east side, which take the place of the wall. The footings for the posts are of concrete, 24 in. square, and rise above grade 18 in. to dimensions of 12 x 12 in. The posts are 8 x 8 in., secured to the footings by ¾-in. dowel pins 6 in. long. On top of the posts and beneath the girders are 8 x 8 x 30 in. caps, the girders being 8 x 12 in. The floor joists are 2 x 10 in. spaced 20 in. on centers. The collar beams, studs, sills, rafters, braces and plates are all 2 x 6 in., the rafters being spaced 24 in. on centers with collar beams for every set of rafters. The second floor is double, with a good grade of paper between, the top flooring con-

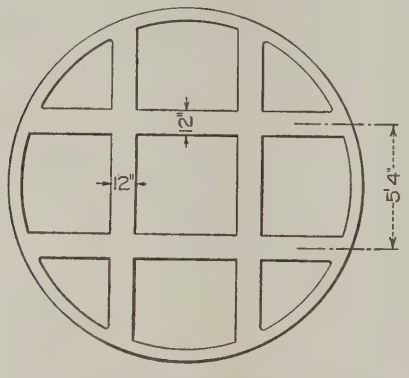


CATTLE FEEDING BARN AND SILO WITH PIGGERY SEEN AT EXTREME RIGHT

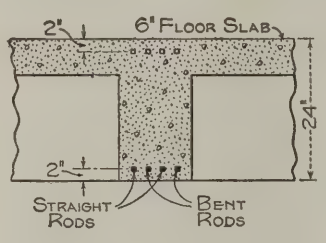
sisting of ⅞-in. dressed and matched material. At the north end of the hay mow is a 5 x 7 ft. hay door opening, the track for the carrier running the length of the barn at the ridge.

For the silo a concrete foundation 6 ft. deep is provided with 24-in. footings, a 12-in. wall being carried 2 ft. above grade and 6-in. tile set in the center of the wall. At the feed alley openings 2 ft. wide are provided to the top of the silo. The silo is 14 ft. in diameter and 44 ft. high to the water tank, the tile exterior continuing to a height of 20 ft. to house a concrete tank 10 ft. in diameter and 16 ft. high. The roof of the tank has a dormer facing south, all of which is shingled.

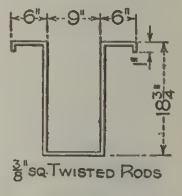
The floor of the tank is of reinforced concrete throughout. There are four concrete beams, 12 x 16 in., and 6-in. floor slabs are reinforced with ⅜-in. square twist rods laid 8 in. on centers in both directions. The reinforcing work required ¾-in. twist rods of various lengths, viz., eight 16 ft. 2 in. long, four 14 ft. 1 in. long, four 14 ft. 7 in. long, in addition to 730 lineal feet of rods for stirrups and floor reinforcing work. All rods were bent into shape on the job according to the details shown in the accompanying drawings.



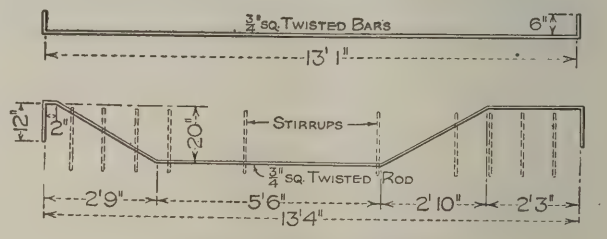
Bottom of Water Tank in Silo



Section of Tank Floor Slab



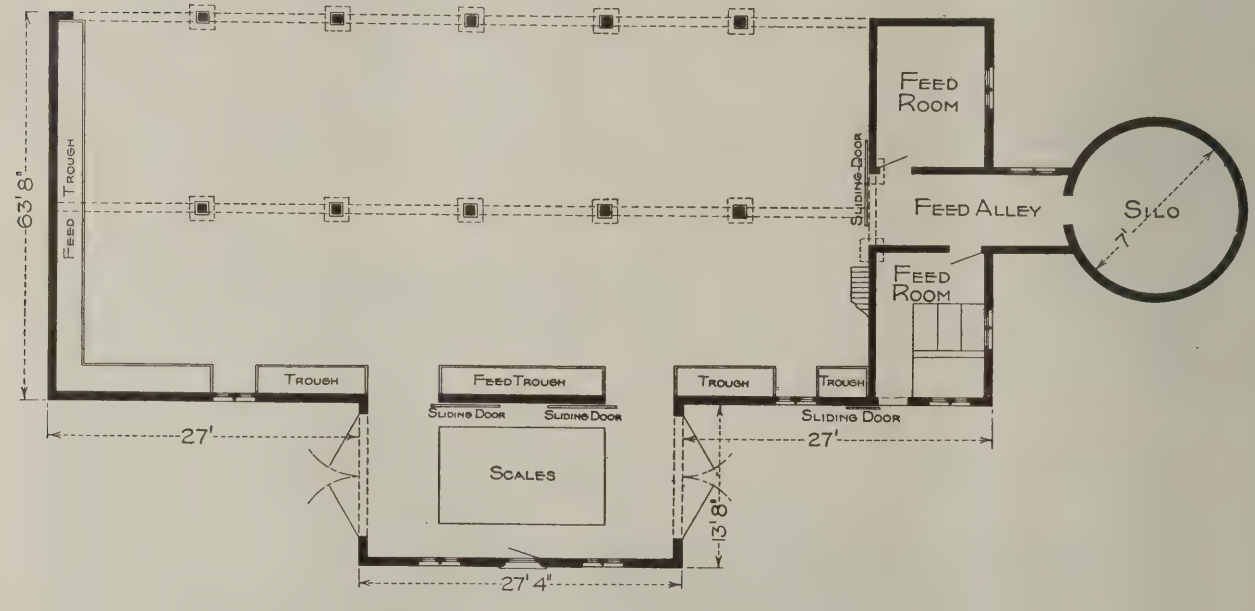
Detail of Stirrup



Details of Tank Reinforcement

The implement and wagon shed is a combination structure designed to accommodate all farm equipment, with the exception of a thrashing machine and wagons, while a section has been reserved for a corn crib. As shown in the picture, the wagon shed is open and built without doors while the machinery shed is equipped with two sliding doors. The building is 76 ft. long, divided into two sheds of equal dimensions, the corn crib occupying a space back of the wagon shed, measuring 6 x 38 ft., and having doors at each end. Windows are installed on either side of the building 6 ft. above ground, the dormers being ornamental rather than useful, as they are boarded up.

The shed rests on a concrete foundation and the walls are 2 ft. above grade. The posts at the front of the wagon shed are 8 x 8 in., resting on concrete footings with a 10 x 22 in. base and a 10-in. square top. The posts are topped with 8 x 10 in. caps, the studding 2 x 6 in., placed 2 ft. on



Floor Plan of Cattle Feeding Barn and Silo—Scale 1/16 In. to the Foot

DETAILS OF TANK IN TOP OF SILO AND PLAN OF CATTLE BARN

centers and 18 in. on centers in the corn crib. The outside studding of the crib is covered with 1 x 5's beveled, with wire on the cross pieces and the partition covered with 1 x 5's square, with wire on the uprights under the cross pieces. All rafters are 2 by 2 in., placed 2 ft. on centers with 2 x 6-in. collar beams for every rafter.

Particular attention has been paid to the design and construction of the poultry house, in view of the fact that the stock is housed the year around. Here we find an exceptionally fine type of modern building with a south frontage, thus affording a maximum amount of light throughout the day. The proportion of glass surface to wall surface on this side is unusually large, and the provisions are sufficient to light all corners of the building. The poultry house is 16 ft. wide, 48 ft. long and 10 ft. for cleaning the dropping board. Partitions are provided between the pens and covered with standard poultry netting which is stapled to wooden upright posts.

A feed bin in the alley has six compartments of equal dimensions. The bin is 12 ft. long and 14 in. wide with a hinged cover, each compartment being 14 in. wide, 24 in. long and 24 in. deep.

Each pen has a 40 ft. dirt run with a door at the south end 5 ft. 6 in. high and 3 ft. 9 in. wide, high screens being built between the runs.

The poultry house has concrete footings 12 in. at the base and 8 in. at the top. Foundation walls are 2 ft. above grade and the concrete floor is 6 in. thick. The studs and rafters are 2 x 4-in., spaced 16 in. on centers and covered with 1 x 6-in. boards. Supporting posts are provided down the



REAR VIEW OF CATTLE FEEDING BARN WITH SILO AT THE EXTREME LEFT

6 in. high, arranged with four scratching pens complete with roosts and nests except in the east pen, which is open. A 4-ft. alley runs the length of the building back of the pens and has a door at each end. There are two tiers of sixteen windows, arranged in groups of four to each pen, one tier about 2 ft. above grade and the other above the roof of the pens. Each scratching pen is therefore lighted by four windows covered with poultry netting, muslin screens being also provided to keep out direct drafts. Small doors at the ground level are provided to the runs and between the pens, while there is also a door from the alley to each scratching pen.

There is a total of sixty nests, each pen having two tiers of ten nests. The nests are accessible from the alley for gathering eggs, each group of five nests having a door hinged at the bottom and a catch at the top. On top of the nests are the roosts, which are hinged so that they may be lifted center of the building of 4 x 4-in. material, resting on 10 x 10-in. concrete footings. The doors at each end of the alley are 1¾ in. thick, of four-paneled stock, having dimensions of 3 ft. x 6 ft. 6 in. The feed bin is built of 1 x 6-in. planks, 12 ft. lengths being used for the front of the bin and the hinged cover.

In the construction of the runs, 4 x 4-in. posts are spaced 7 ft. apart the length of the runs and 1 x 4's midway between the posts. The baseboards are 1 x 6 in., securely nailed to every upright, the top members being 2 x 4's in 14 ft. lengths for the sides and 12 ft. lengths for the ends. The entire framework is covered with standard poultry netting, as are the door frames at the end of the runs, the latter being built of 1½ x 2 in. stock, hinged to swing outward.

From the standpoint of construction and lighting, the piggery is practically a duplicate of the poultry house, the difference being in the arrange-

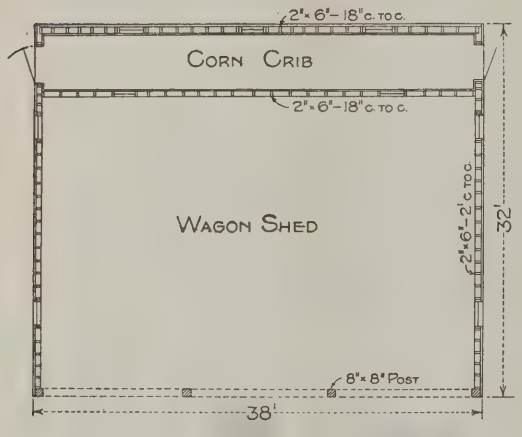
ment of the pens and the windows lighting them. Windows are provided on three sides of the building, the majority on the south side. Each pen has two large windows with six divisions, the end pens being also lighted by the same number of windows on the east and west sides. Above the roof of the pens is a tier of twelve windows in six groups of two. The building is 50 ft. long and about 30 ft. wide, with runs to the south of 60 ft. and a 30 x 60-ft. feed floor on the southeast corner. The lower tier of windows provides for an individual control while the upper tier is operated as a whole over a pulley, the bottom windows opening inward for a distance of 13 in., being equipped with hinges at the bottom and a catch at the top.



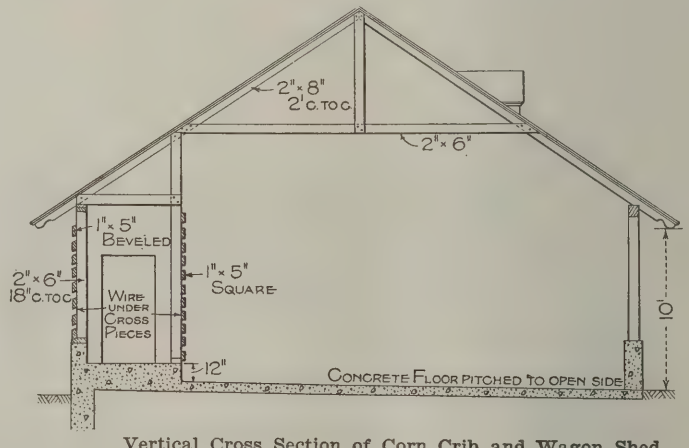
The Pump House with Horse Barn in the Background

A 4-ft. alley runs the full length of the piggery down the center, on either side of which are the pens. On the south side of the alley are six pens of equal dimensions, while the opposite side has three single pens, one double pen and a section accommodating a cauldron and feed bin. The arrangement of the pens is such that either side can be converted into one large pen, or any number up to six, as desired. This feature is made possible by slots in the concrete walls, into which boards are dropped to form partitions. The average pen measures 12 ft. long and approximately 9 ft. wide, so four 12-in. boards laid edge to edge in the slots are sufficient to make a 4-ft. partition. Each pen has a 27 x 32-in. hinged door off the aisle, opening inward, so that the pigs cannot get out.

The floors of the pens are half concrete and half creosoted blocks, the concrete section having a concrete feed trough, the block floor being on the run side. Each pen has a trough 6 ft. long, 20 in. wide and 9 in. deep, the inside of the trough being semi-circular in shape, of 15-in. diameter and 8 in. deep. The trough is made into four compartments by ¾-in. twisted rods 16 in. long, running the width of the trough and imbedded in the concrete at each side. All troughs are fed from the alley, and are hidden by a door 6 ft. long and 4 ft.



Plan of Wagon Shed and Corn Crib—Scale 1/16 In. to the Foot



Vertical Cross Section of Corn Crib and Wagon Shed



General View of Implement and Wagon Shed

DETAILS OF CORN CRIB AND WAGON SHED

wide, hinged at the top and opening at the trough, a large bolt at the bottom preventing the hogs from pushing their way out of the pen.

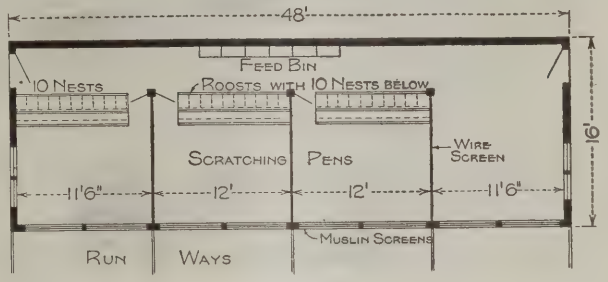
The pen in the northwest corner is equipped with a large cauldron, proper connection being made to the chimney. There is also a large feed bin with sloping cover, hinged at the back with 4-ft. compartments. The bin is 11 ft. long, 4 ft. 6 in. high at the back and 3 ft. high at the front, each division being about 2 ft. 6 in. square.

Each pen has a 60-ft. run with a rough concrete floor. The fences between the runs are 3 ft. 6 in. high and hog fence wire securely fastened with staples to within a foot of the top. Posts of 6 in. diameter are placed every 7 ft. 6 in. and fence wire fastened between the posts in 1 x 4-in. uprights at the posts. The 1 x 4's are nailed top and bottom to 1 x 6-in. planks in 15-ft. lengths, the same size planks being used to finish off the top of the fences. The construction and framing of the building is the same as employed in the poultry house, with the exception that concrete walls on the inside of the building are extended to a height of approximately 4 ft., with slots to accommodate the planks for pen partitions.

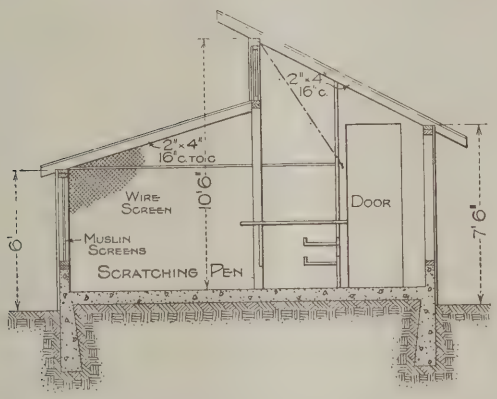
The garage is 25 ft. wide and 45 ft. long, well lighted on all sides and also by dormer windows. The building has a capacity to hold two or three automobiles, leaving plenty of room for a large tool box, barrels of oil, a forge and anvil, with enough space to move around in to repair the cars whenever necessary. The garage has two sliding doors with an ordinary door between. The foundation is of concrete 2 ft. above grade and the floor is of concrete, pitched to a floor drain.



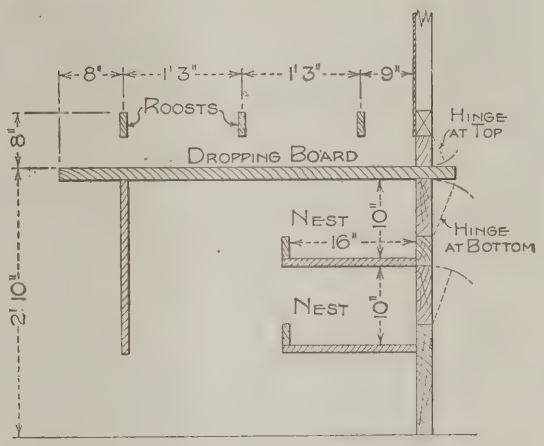
General View of the Poultry House



Plan of Poultry House—Scale 1/16 In. to the Foot



Vertical Cross Section—Scale ⅛ In. to the Foot



Details of Nests and Roosts—Scale ½ In. to the Foot



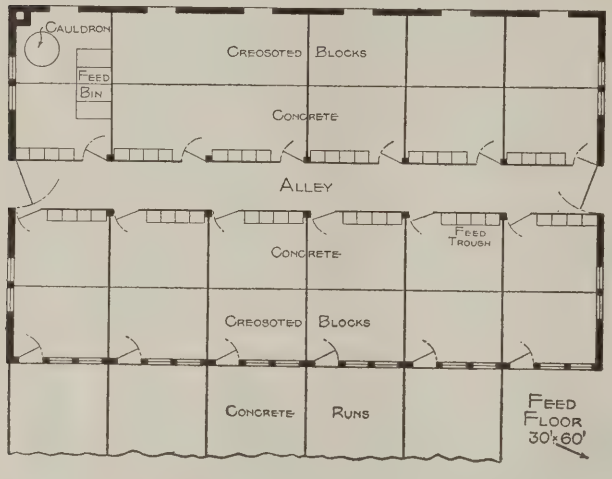
Details of Lighting and Ventilating Arrangements

THE POULTRY HOUSE ON EDELLYN FARM



End and Side Views of the Piggery

The pump house is 9 x 15 ft. in plan and the creamery 12 x 20 ft., the former housing a deep well power pump connected to a 2-hp. motor, the latter being large enough to take care of an ice-



Plan of Piggery—Scale 1/16 In. to the Foot

box, enameled iron sink, cream separator and churn, all of which are conveniently arranged around the sides of the building, leaving an open space to move around. The building has a concrete floor, is equipped with running water and a floor drain.

The buildings described herewith contain a variety of modern equipment to facilitate operations on the farm. The stanchions are of a type made by the Louden Machinery Company, Fairfield, Iowa; the hangers for sliding doors by the Richards-Wilcox Mfg. Company, Aurora, Ill.; the tile for the silo by J. M. Preston, Lansing, Mich.; power pump by the Deming Company, Salem, Ohio; two horsepower electric motor by the Wagner Electric Mfg. Company, St. Louis, and the piggery cauldron by Gohmann Bros. & Kahler Company, New Albany, Ind.

The farm is owned by Thomas E. Wilson, Edellyn Farm, Waukegan, Ill., and was constructed under his personal supervision and that of Mr. Dickson, his superintendent, with the collaboration of Mr. Pirot of Morris & Company, Chicago, Ill.

USING HYDRATED LIME IN CONCRETE

The effectiveness with which hydrated lime acts as a waterproofing material is well known, but it is not so generally recognized that hydrated lime introduces other characteristics into concrete that result in rendering it of first quality. It is well known that when hydrated lime is used in cement mortar, says a correspondent, the mortar can be more easily worked under the trowel and better bearing surfaces for the bricks can be made. Add a small amount of hydrated lime to concrete and the same thing happens; the concrete become closely compacted, and the result is a uniform, dense, waterproof piece of work. Concrete containing hydrated lime will flow freely through the chutes or spouts, or out of barrows without the use of excessive quantities of water, and at the same time the use of hydrated lime will be the means of keeping the strength of concrete more nearly normal.

The added plasticity which hydrated lime gives to concrete is the basis of the advantages to be derived from its use. Ten pounds of hydrate to each bag of cement used in a batch is the recommended quantity. An ordinary eight-quart pail holds approximately ten pounds of hydrated lime so that accurate measurements may be made. These are all demonstrated actions of hydrated lime, and should excite the attention of everyone doing concrete work to the possibilities which hydrated lime offers.



Side View of Piggery Showing Portions of the Various Runs

SOME SIDE LIGHTS ON WOOD FINISHING

GRADES OF SANDPAPER—FILLERS AND THEIR APPLICATION IN NATURAL FINISH AND COLORS

IT would be interesting to know just when or how sandpaper was invented and who was the first to think of it. Such a simple thing—just a scrap of paper and some glue and sand on it. Who could not have thought of that? But like many another simple invention, it was left to some reflective person to first think it out. Sandpaper does not occupy the office it once did, of course, for it is no longer chief scratcher, steel wool having taken its place—in a measure only, however, as for many purposes sandpaper or glass paper still holds good as the best.

USE OF SANDPAPER

Quite a little essay might be written about the homely but useful sandpaper; and it would be useful reading, too. Following it up in its various degrees of fineness or coarseness, as the case may be, from 000 to 4 (as a neat sample tablet before me gives the numbers), we see the different kinds of work it will do; the finest smooth enough to polish a lady's finger nails, the coarsest rough enough to serve as a section of turnpike road.

But what I started out to tell about was the using of sandpaper. There is a sandpapering machine that makes a surface something wonderful to behold, for it makes circular tracks, and these are not always smooth. It does pretty well for hard, close-grained woods, but on soft, open-grained woods the fine fibers rubbed off by the sandpaper are forced into the open pores of the wood and cause trouble in the finishing. Hence an open-pore or open-grained wood that has been through the sanding machine should be rubbed across the grain with No. 1 sandpaper, after which it should be well dusted off, to remove all loose fibers of wood. This before filling wood for the usual finish.

Many persons do not know that there is a right and wrong way to cut a sheet of sandpaper in two. The right way is to fold it evenly with the sanded part inside, which will prevent cracking or uneven folding. Then cut with a table knife or painter's putty knife, pulling the blade against the paper

FOR SMOOTHING LARGE SURFACES

For sanding off some surfaces, say those which are large and level, it is best to use a block of soft-wood, about 2½ x 3½ in. To one side of the block glue a piece of rubber belting or sheet rubber of some sort, and when the glue has become dry saw the block into a series of slits, about 3/16 in. apart and to within about ⅛ in. of the rubber. The purpose of these slits is to make the block flexible, which will enable it to fit into a concaved or other shaped surface. Another and similar block may be made solid, for sandpapering large, even surfaces.

Fine as the finest numbers of sandpapers are, yet they are not quite the thing for some kinds of work—such as would be marred by fine scratches and yet must be smoothed down. In such cases it is customary to use fine sandpaper that has been worn down by use until very little sand is left. Another way, thought by many workmen to be better than the worn paper, is that prepared by rubbing two sheets of fine sandpaper together, which removes all of the grit, leaving only the finest particles of sand. A little raw linseed oil is then applied to the face of the paper, on the sanded side, which makes all scratching that would show, impossible. Of course there is scratching, without which the sandpapering would be useless, but it is not seen by the naked eye. Sometimes a piece of coarse canvas may be used with satisfactory results. It all depends upon the character of the surface which is to be smoothed down. For rubbing down hardwood filler No. 0 glasspaper is best. Glasspaper is of a better grade than the ordinary sandpaper, which is flint, not mere sand, the flint being crushed and sifted into grades, just as they do with crushed glass. For a still harder paper garnets are crushed.

TESTING SANDPAPER

There are several ways of testing sandpaper for quality, but the expert workman knows almost by looking at it what it is. Good quality sandpaper will split in two, this sometimes being done in order to get a thin sheet to work in moldings, etc. A poor-grade paper will not split this way. It is not necessary to tell the reader that a good grade of sandpaper is the cheapest in the end.

To prevent sandpaper from slipping under the hand, chalk it on the back. The application of a little benzine or turpentine on the sand part will cause the paper to cut faster. Keep the sandpaper in a dry place; if damp, dry it before using it. Always dampen sandpaper with a little benzine or turpentine before using to sand white lead paint. Save partly worn pieices, for delicate rubbing.

Sandpaper the raw wood with the grain only, to avoid scratches. It is perhaps best always to sandpaper filled wood with the grain. Scratches are difficult to remove, and add to the expense. The fuzz raised on the wood by staining is easier to remove just after the filling than at any other time. All liquid-filled wood should be made smooth with sandpaper before varnishing.

So much for sandpaper, though I might fill out this article with the subject and still not be done.

*A. Ashmun Kelly in the *Wood-Worker*.

Now I shall say a few things concerning the work of wood-filling, giving some notes on fillers and their use. If you make your own filler, see that the silex is dry; if not dry, place it in the oven.

As between thick and thin paste fillers, I say thin. Thick filler will do well only on very coarse wood. Usually it will make rough work and require a lot of rubbing down. It might be well to take a middle course, neither too thick nor too thin. Two thin coats are better than one heavy coat of filler. In fact, the two thin coats are nearly always preferable; it is, however, a matter of expense of time. Such two coats of filler ought to be applied at an interval of not less than twelve hours. Then the filling ought to have at least twenty-four hours for drying before varnishing, although twelve hours will do in a pinch. After you have filled the wood, wait until the stuff turns dark-looking, or grayish, then wipe it off across the grain of the wood. Usually it requires about twenty minutes for the filler to set enough for the rubbing off. A shop rule is from 10 to 14 lbs. of paste filler to the gallon of thinner.

A GOOD PASTE FILLER

A good paste filler will fulfil these conditions: Fill the wood completely; not be easily affected by moisture or any atmospheric influences; unite readily with the wood; remain firm as long as the wood endures intact; be translucent, so as to show up the color and texture of the wood; be simple, cheap and easily applied, and never shrink or swell and thus affect the wood.

Whiting and china clay, often used in fillers, will not fulfill these conditions—nor cornstarch—all being too opaque, hiding the beauty of the wood. Umber and sienna are not positively bad, but they will not do on light-colored woods, nor do they develop the grain on any wood. Too much oil is bad in a filler, causing shrinkage of the filler and a falling away in time, causing a marred surface. Pulverized silica is the very best substance for making the base of a paste filler. When pure it is perfectly translucent. It may be ground to an impalpable powder and still retain its crystalline formation. These crystals fit into the pores of the wood and stay there. Silica has also an affinity for oil and other essential thinners, these being necessary for its application and drying hard.

NATURAL WOOD FINISHING

For natural wood finishing, where the color of the wood must not be altered any more than may be unavoidable, no pigment is used, and for this reason such filler is the best, as coloring weakens it according to the amount incorporated. Some fillers contain as much as 25 per cent of color, necessary for some woods, and this makes a filler that will not fill the pores properly. The colors generally employed for coloring fillers are as follows: For light oak, raw sienna or ochre; dark oak, burnt umber or drop-black, or both combined; golden oak, burnt umber or asphaltum, the latter giving the best color effect, but being less desirable for the reason that it acts badly under varnish; walnut, burnt umber enriched with a little Venetian red or rose pink. Black walnut is best filled with paste filler colored with Vandyke brown; mahogany, burnt Italian sienna, rose pink and a little drop-black; redwood, burnt sienna and a touch of rose pink; Brazil wood, rose pink; cherry, burnt sienna or Venetian red.

A good formula for making a natural color paste filler for coarse woods, such as ash, butternut, chestnut, elm and the oaks, is: Mix together two parts of pale linseed oil, three parts of japan gold size and one part of turpentine, adding pulverized silica to form the paste. Make a thick paste and thin it down when about to use.

SHELLAC AS A SURFACER

Shellac does as a surfacer for birch, beech, cypress, maple, red gum, sycamore and white pipe. In some cases liquid filler may take the place of shellac, being much cheaper. Where shellac is used make it of the strength formed with a pound of gum to the gallon of alcohol. Maple requires the use of bleached or white shellac, owing to its being a very light-colored wood. Orange shellac does for any wood having some color.

A good filler for redwood is made as follows: Cornstarch, 1 lb.; dry burnt Italian sienna, ¼ lb.; mix with 1 qt. of turpentine, and add also a tablespoonful of raw linseed oil and brown japan. Mixing is done best in a hand mill, though it may be done all right with a spatula or paddle, taking care to make the mixture perfectly homogeneous. Cornstarch seems to be preferred by those who have much of this wood to fill, although it does not, of course, make as durable a filler. There can be no reason for supposing that silica would not do fully as well.

FILLER FORMULAE

Filler formulas are many, but I have given the standard and best in the one indicated for ash, chestnut, etc. For the oaks we must fill as each kind demands. For an uncolored natural finish mix together one part of raw oil and two parts of turpentine, with japan dryers enough to dry the filler properly. Dark oak requires some coloring, and the filler indicated for ebony may be used, as follows: Make up a paste of dry lampblack or burnt umber and plaster of paris (or silica), mixing to a paste with brown japan or gold size japan. For golden oak filler use the natural paste wood filler, colored with burnt umber and asphaltum. The formula follows: To 10 lb. of uncolored paste filler add 4 oz. of dry burnt Turkey umber and ½ pt. of best asphaltum varnish. Mix to a paste.

The best of liquid hard or softwood filler may be made by thinning down a paste filler, with turpentine or benzine. But if color is to be used it is generally best to use cornstarch, as being of lighter gravity than silica. The heavy silica will settle in the pot; cornstarch will not. This settling or sinking down of the base would leave the color on top, and so, unless the mass were kept constantly stirred, there would be very poor filling. Color would also settle in the pores of the wood, causing uneven color and filling.

VENTILATION OF THE MODERN FARM BARN

DIFFERENT SYSTEMS THAT MAY BE USED —DETAILS OF VALUE TO THE BUILDER

By L. Klima

A BARN is ventilated for the purpose of keeping the air fresh at all times during the season when the building must be closed, to take out the excessive moisture, and to keep up the temperature to a comfortable degree during all kinds of weather. This is much easier said than done for in a barn we do not have the advantage of artificial heat, or in most cases, of the use of a propelled fan with which to move the air.

Besides depending upon the heat which is thrown off by the animals which are housed in the building, which varies according to the kinds and sizes, the further problem of humidity in different parts of the country as well as the elevation or altitude is a very important factor in deciding how to ventilate a barn.

FLUE AREA

So far there has been no definite rule which can be established as to the amount of flue area that can be used for each animal due to the fact that it depends entirely upon the climatic conditions of that community.

There are two motive powers which can be utilized in ventilating systems for barns. First is the effect of the wind. Wind, by the pressure on one side of the building may force air into it, and thus drive the air inside out through the ventilating flues, or other openings at some other point.

The suction caused by the wind blowing over the top of the ventilator on the roof will also assist materially in creating a circulation for the air on the inside of the building. In fact, the ventilator on the roof is by far the most important of the three units of ventilation which are the ventilator on the roof, the foul air flues, and the fresh air intakes.

THE SOURCE OF HEAT

The only source of heat in a barn is the animals themselves. For this reason the barn in which the ventilating system is installed must be built in such a way that the greatest possible amount of heat generated by the animals can be retained in the building.

The circulating of the air from the outside to the inside of the building, and from the inside to the outside, does not in any way increase the temperature of it. It has a tendency to decrease the temperature of the barn unless these flues are so arranged that the warm air is trapped in the building.

The walls of the building should be double boarded with matched lumber, with paper between, and all openings between the studding should be closed up tightly. Provisions should be made for closing the hay chutes, stairway openings and other openings in a ceiling so that the air will not leave at the highest level of the stock room.

Unless the temperature of the room is much higher than the temperature outside, the ventilating system cannot possibly produce its best results.

TYPES OF VENTILATION

There are three types of ventilation for barns which have come to the writer's attention. First and most common is the system of broken windows, loose doors, poorly constructed walls and ceilings, open hay chutes, open stairways, poor floors, and in fact anything that will allow a movement of air through the building. Such a system will keep the air fresh and pure, but fails to keep the stock comfortable. For this reason this system makes the building no better than a shed with a roof over it. The value of the barn has been lost for the reason that it has not been properly constructed to accomplish the results.

The second kind of system is known as the Rutherford System which removes the foul air from the ceiling line and brings the fresh air in at the floor.

There is no doubt but what a system of this kind will remove a great deal of air. It has been a question, however, as to whether it is possible to retain enough heat in the building by this method to keep the room comfortably warm.

As this system has not been used extensively in this country very little can be said for it, but it would not seem possible that a ventilating system which took the warm air from the ceiling out of the building could possibly hold enough of it in the room to make it a comfortable place for the stock.

The third, and perhaps the most successful system known in this country, is the King System of Ventilation originally worked out by the late Prof. F. H. King of the University of Wisconsin, and since that time improved and developed to its present high state of efficiency due no doubt to the fact that it has been commercialized.

SPECIAL DESIGNING

A ventilating system, like a heating plant, must be designed individually for the building into which it goes. The farm papers, and many of the trade papers, have made it appear that ventilating a barn is a very easy matter, while the fact remains that it is a much easier problem to heat a building than it is to ventilate it without the use of fans or artificial heat.

While the King System of Ventilation consists of three principal units, the aerator on the roof, the

foul air flues, and the fresh air intakes, these are only the principal units of the ventilating system just the same as the boiler, radiators, and the pipes are the principal units of a hot water system for a house.

Unless you would have the unions, elbows, valves, and a hundred and one other things which enter into a heating plant, the three principle units could not possibly be made to heat the building.

This is exactly true of a ventilating system for a barn, for it depends largely upon the details of the construction of these three units as to what results can be accomplished in the way of circulation of air through the building.

As there are only three things that produce flesh, bone and milk, and these three things are feed, water and air, you can perhaps more fully realize why ventilation is so important in the modern barn when you understand that it requires the oxygen contained in two pounds of air to properly assimilate each pound of feed and water combined.

Animals will live and produce with a very small percentage of oxygen as compared with what they should really have, but the fact still remains that they will be larger producers, that they will remain in better health, and thus be able to ward off diseases if they receive all the oxygen required.

Preventing the fresh air from entering into a barn has just exactly the same effect on the stock as preventing them from getting enough feed or water. The process in both cases of reducing their vitality is slow, but it is nevertheless very certain.

The animal which receives its full proportion of oxygen in relation to the feed and water is the animal that will be the greatest producer, and be of the stronger constitution. It takes years of breeding and studying to produce a good animal, but it takes only a few months in the ordinary barn without a ventilating system to reduce the vitality of this animal to a point where it is susceptible to all the diseases which are lurking about, and when this time comes, the labor of many years is lost on account of the carelessness in neglecting to furnish the animal with Nature's greatest disinfectant, which is fresh air.

BULLETINS ON FARM BUILDINGS

A. R. Gregg, professor of agricultural engineering, University of Saskatchewan, Canada, in cooperation with Prof. A. M. Shaw and Prof. R. K. Baker of the Animal Husbandry Department of the same institution, and L. B. Beale, British Columbia Forest Service, has prepared a series of ten bulletins on farm buildings. Plans and discussions on planning are given for farm houses, general purpose barns, horse barns, sheep barns, beef cattle barns, dairy barns, ice and milk houses, piggeries, smoke houses, poultry houses, implement sheds, granaries, silos and root cellars. These buildings are designed specially to meet the conditions of Canadian prairies. Each design has been made as simple and economical as possible, in order to meet the needs of the average farmer. Timber construction is shown in every case, the larger buildings having concrete foundations, and some of them concrete floors. The plans, although printed to a small scale, show sufficient detail that they may be used as working plans.

TENEMENT HOUSE CONSTRUCTION IN NEW JERSEY

A report just issued by Miles W. Beemer, secretary of the Board of Tenement House Supervision of New Jersey, gives a comparative statement of tenement house construction in that state in September, 1916 and 1915, as follows:

	September	
Municipalities	1916 Cost, Estimated	1915 Cost, Estimated
Atlantic City	$31,000	$12,000
Bayonne	22,000	15,000
Belleville	.....	5,000
Caldwell	.....	15,000
Clifton	.....	6,000
East Orange	100,000	.....
Edgewater	18,000	.....
Elizabeth	14,000	10,000
Fairview	.....	4,000
Garfield	5,000	.....
Guttenberg	8,000	.....
Harrison	5,000	.....
Irvington	16,000	14,000
Jersey City	224,000	148,000
Kearny	.....	18,000
Lodi	.....	18,000
Montclair	.....	3,000
Newark	119,000	131,000
North Bergen	9,000	16,000
Nutley	26,000	.....
Orange	15,000	.....
Palisade Park	.....	18,000
Passaic	53,000	65,000
Paterson	13,000	41,000
Summit	.....	7,000
West Hoboken	14,000	38,000
West New York	204,000	67,000
West Orange	.....	13,000
Total	$896,000	$664,000
Alterations	21,600	15,900
	$917,600	$679,900

It will be seen that Jersey City, with $148,000, and Montclair, with $3,000, represent the respective extremes.

UNIFORM BUILDING LAWS

It is said that Reading, Pa., will probably adopt the State Building Code, thus saving the expense and trouble consequent to the drafting of a new code. It is suggested that small cities and towns adopt the code of the State in which they are located, as the State experts would probably be better fitted than the local men to draft a code in strict accordance with the best practice. This idea of a uniform code throughout the State is advocated in Massachusetts by the Boston Society of Architects, and its adoption would certainly be beneficial to the best interests of the building trades.

DON'T MIX SAWDUST AND CEMENT

The report which recently circulated through the West that some department of the Iowa State College had recommended the use of sawdust mixed with cement for making concrete floors has been officially denied by Prof. M. F. Costello, head of the Department of Agricultural Engineering, who says: "There is no department of the Iowa State College that would recommend a cement floor made from a mixture of sawdust and concrete."

THE BUILDING TRADES IN LITERATURE

WHAT THE BIBLE, AND SOME WELL-KNOWN WRITERS, HAVE TO SAY REGARDING THE BUILDER

By A. L. H. Street

FEW occupations have been as much applauded in literature as those of the architect and the builder. Lawyers and doctors have not fared as well in the esteem of authors and poets as have those who are engaged in useful constructive work. God is often typified as the Great Judge, or the Great Physician, but oftener as the Master Builder.

Long before the advent of Christ and Joseph into sacred history, the occupation of the carpenter and of the stone mason had come to be regarded as one of the highest utility to mankind, and of dignity. The Bible witnesses that the members of those trades were looked upon as honest and industrious men, by referring to the building of "sure" and "goodly" houses, and by crediting the builders of Tyre with having "perfected its beauty." The Book vouches for the faithfulness of ancient craftsmen in several places where it is mentioned that great chests of money were "laid out to the carpenters and builders." "Howbeit," reads one passage, "there was no reckoning made with them of the money that was delivered into their hands, because they dealt faithfully."

In other words, in those "good old days," a builder of a church does not seem to have been required to file a mechanic's lien to obtain payment for his services, nor to have been obligated to give a bond to secure performance of his contract. It does appear, however, that there was some danger to workmen other than of being assaulted by strikers, for the Bible speaks of builders working with "swords girded by their sides."

Longfellow thus pays his compliments to the ancient builders:

> "In the elder days of Art
> Builders wrought with greater care,
> Each minute and unseen part,
> For the Gods see everywhere."

Coming to modern literature, we find architecture referred to by Schelling as "frozen music." He doubtless deemed it *harmonious* music, but Burns recognizes the fact that there may be an occasional *discord* in building when he says:

> "Windows and doors in nameless sculpture drest
> With order, symmetry, or taste unblest;
> Forms like some bedlam statuary's dream,
> The crazed creation of misguided whim."

Carew sees the power of an architect to make a home comfortable:

> "Here the architect
> Did not with curious skill a pile erect
> Of carved marble, touch, or porphyry,
> But built a home for hospitality."

The work of builders has been thus glorified by Emerson:

> "The hand that rounded Peter's dome,
> He builded better than he knew."

And Milton wrote:

> "The hasty multitude entered, and the work some praised, and some the architect: his hand was known in Heaven by many a tower'd structure high."

Ruskin places architects on a plane with painters and sculptors: "No person who is not a great sculptor or painter *can* be an architect. If he is not a sculptor or painter, he can only be a *builder*."

But all the genius of building is not to be monopolized by man, according to Pope, for he enjoins upon us that we "the arts of building from the bee receive," and Mulock speaks of the makers of a wren's nest as "its merry architects so small."

Just as the clanging of the blacksmith's anvil has been music to the poet's ear, Walt Whitman found music in the plane:

> "The carpenter dresses his plank—the tongue of his foreplane whistles its wild ascending lisp."

The antiquity of the carpenter's disposition to "talk shop," and of his apron and rule is suggested by these lines from Shakespeare:

> "He talks of wood; it is some carpenter."
> "Speak, what trade art thou?"
> "Why, sir, a carpenter."
> "Where is thy leather apron and thy rule?
> What dost thou with thy best apparel on?"

Humorous reference was made to the trade by Dickens in "Martin Chuzzlewit," as follows:

> "A man who could build a church, as one may say, by squinting at a sheet of paper."

CONVENTION OF THE MICHIGAN BUILDERS' EXCHANGE

The Associated Builders' Exchange of Michigan will hold its fourth annual convention in Lansing on Nov. 14 and 15. It is expected that many of the leading builders and contractors of the eight cities composing the membership of the exchange will gather on those dates. The exchange committee comprises President C. S. Wilcox of Lansing, Secretary Charles A. Brown of Detroit and Associate Secretary R. K. Orr of Lansing.

PLANS FOR TEACHERS' COTTAGES

R. S. Kellogg, in co-operation with the U. S. Bureau of Education, has treated the subject of teachers' cottages in a Bulletin that is published by the National Lumber Manufacturers' Association, Chicago, Ill. The rural teacher's problem in the matter of securing living quarters is discussed. The solution offered is the building of a cottage on the school grounds for the accommodation of the teacher or teachers. The Bulletin illustrates five cottages to meet different conditions, together with a number of photographs of buildings of this character in different sections of the country.

A FARM HOUSE OF THE COTTAGE TYPE

AN ATTRACTIVE EXTERIOR COMBINED WITH A COMPACT INTERIOR—DETAILS OF CONSTRUCTION

WE have taken for the subject of one of the two colored supplemental plates which accompany this issue a farm house of the cottage type designed to be placed with its broad front facing the road, the building to have a frontage of 53 ft. 6 in. and a depth of 42 ft. 6 in. The foundation walls are to be of concrete 8 in. thick and supported on footings 10 in. deep extending 6 in. beyond each side of the wall above. The concrete used is to be mixed in the proportions of one part Portland cement to three parts sand and five of broken stones.

All framing timbers are to be of spruce with corner posts 4 x 6 in., plates 4 x 4 in., girders 6 x 8 in., first floor joists 2 x 10 in., second floors joists, 2 x 8 in. and second floor ceiling beams 2 x 6 in., all placed 16 in. on centers and strengthened with 2 x 2-in. cross bridging spaced 6 ft. apart. The studs are to be 2 x 4 in. spaced 16 in. on centers, doubled at all openings and stiffened with one row of cross-bridging. The rafters are to be 2 x 8 in. and 2 x 6 in. spaced 20 in. on centers. The porch floor beams are to be 2 x 8 in. and also spaced 20 in. on centers.

THE EXTERIOR FRAME

The exterior frame of the building is to be covered with 1 x 9-in. hemlock sheathing laid diagonally over which is to be placed a layer of three-ply building paper. Upon this are to be fastened 1 x 2 in. furring strips placed 16 in. on centers and to which metal lath to carry the stucco is to be stapled.

The exterior stucco is to consist of two coats, the scratch coat is to be at least a half inch thick outside of the lath surface and is to consist of one part Portland cement, three parts sand and not more than 10 per cent lime putty. The first coat is to be applied under pressure and must be well scratched before it sets. The finishing coat is to be a quarter inch thick and is to be mixed in the proportions of one part cement to two parts clear sharp sand and three parts of pebbles for rough finish. The stucco is to be given a cream tint.

The roof is to be covered with white pine shingles exposed 5½ in. to the weather and are to be dipped in shingle stain at least two-thirds their length before being laid.

The floors of the rooms in the first story are to be double, the sub-flooring to consist of ⅞ x 6 in. tongued and grooved hemlock, while the finish floor in the living room is to be of ⅞ x 2½ in. comb grained North Carolina pine. All other rooms are to have ⅞ x 4 in. North Carolina pine flooring. The attic floor is to be single and of ⅞ x 6 in. pine. The floors throughout are to be brought to a smooth finish, filled and varnished, the living room receiving an additional coat of wax.

All rooms are to be plastered with a smooth hard finish except the living room, which is to have a sand finish.

The trim for the living room is to be of birch, that of all bed rooms cypress, while the kitchen and wash room are to be trimmed with white wood. All doors are to be of cypress. The trim in the kitchen and wash room is to be enameled three coats of white; all bed room trim is to be finished natural, and the living room trim is to be stained a deep brown and should be brought to a smooth flat finish.

THE CHIMNEYS

The chimneys which take care of the furnace and kitchen range are to be built of brick laid up in a good cement mortar and lined with vitrified flue lining. They are to be supported on concrete foundations, and where the chimneys are exposed above the roof they are to be covered with stucco.

Under the entire building, with the exception of the porch and office, is a large basement to contain a furnace room and a laundry together with a large space for the storage of fruits and vegetables.

A good system of plumbing is to be installed with simple inexpensive fixtures. The kitchen is to be fitted with an iron enameled sink and a forty-gallon galvanized iron boiler over the range. In the laundry is to be a gas range and three-part earthenware wash trays. All the plumbing is to be exposed and all rough pipes are to be painted with an enameled paint. The plumbing in the bath rooms is to be of the open type, the bath tub to be iron enameled, the water closet to have a china bowl and high tank, and the wash stand to be enameled iron. The exposed pipes are to have a nickel plated finish.

The hardware is to be of a bronze plate finish so as to match the lighting fixtures and radiators. The lighting is to be by means of electricity and gas, and combination lighting fixtures are to be installed. There are to be three drop pendants of three lights each in the living room.

HEATING SYSTEM

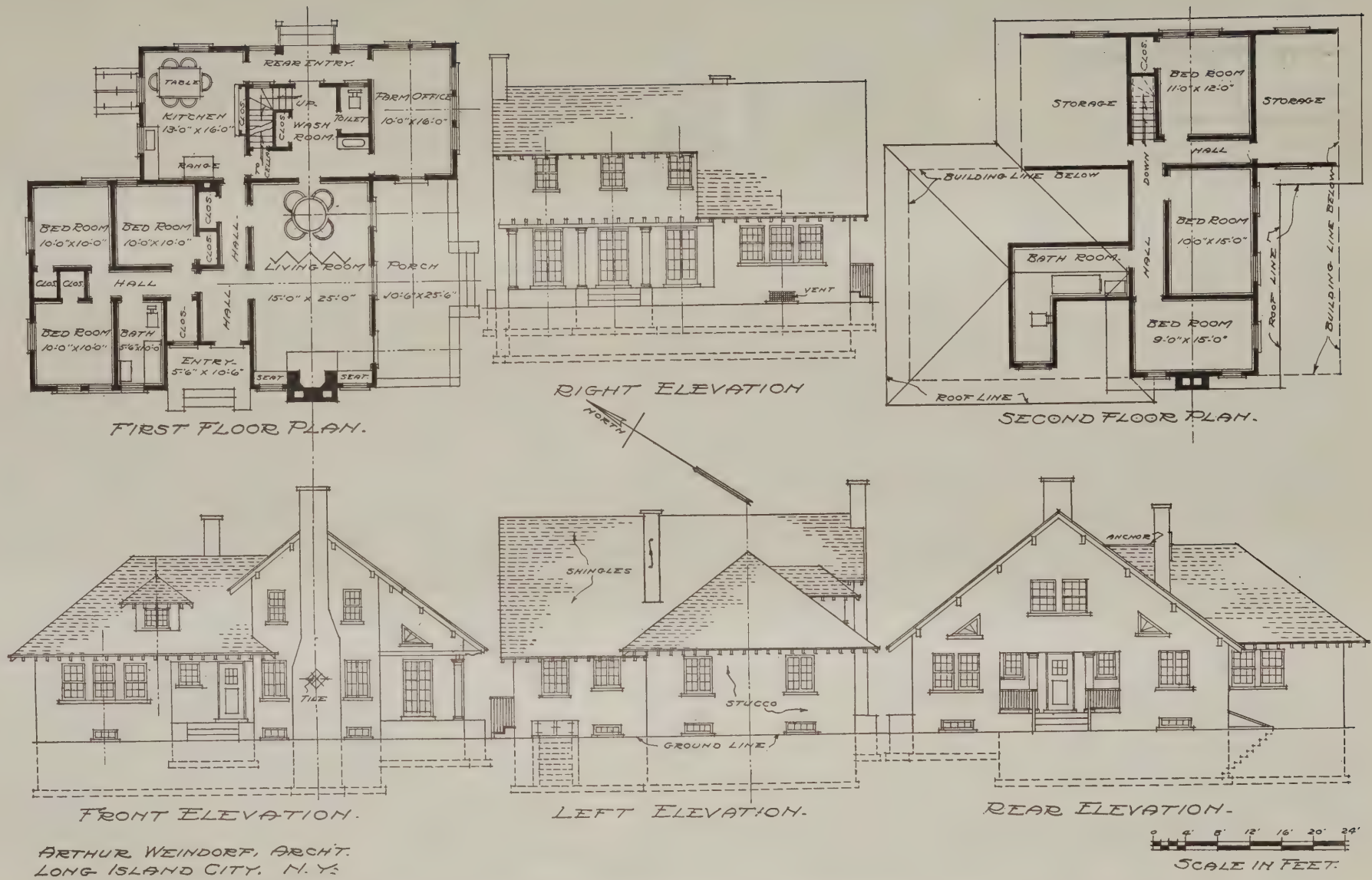
The house is to be heated by steam with radiators of a plain design located in all rooms except the kitchen and to be of such size as to maintain a temperature of 70 deg. in the house when the thermometer registers zero outside.

All exposed exterior trim is to be well puttied and given three coats of white lead and linseed oil. All the sheet metal work is to be painted on both sides before it is laid and all leaders are to be of galvanized iron.

This farm house has been planned with the idea in view of compactness of arrangement while at the same time keeping the living rooms of the family separate and distinct from the rooms which are

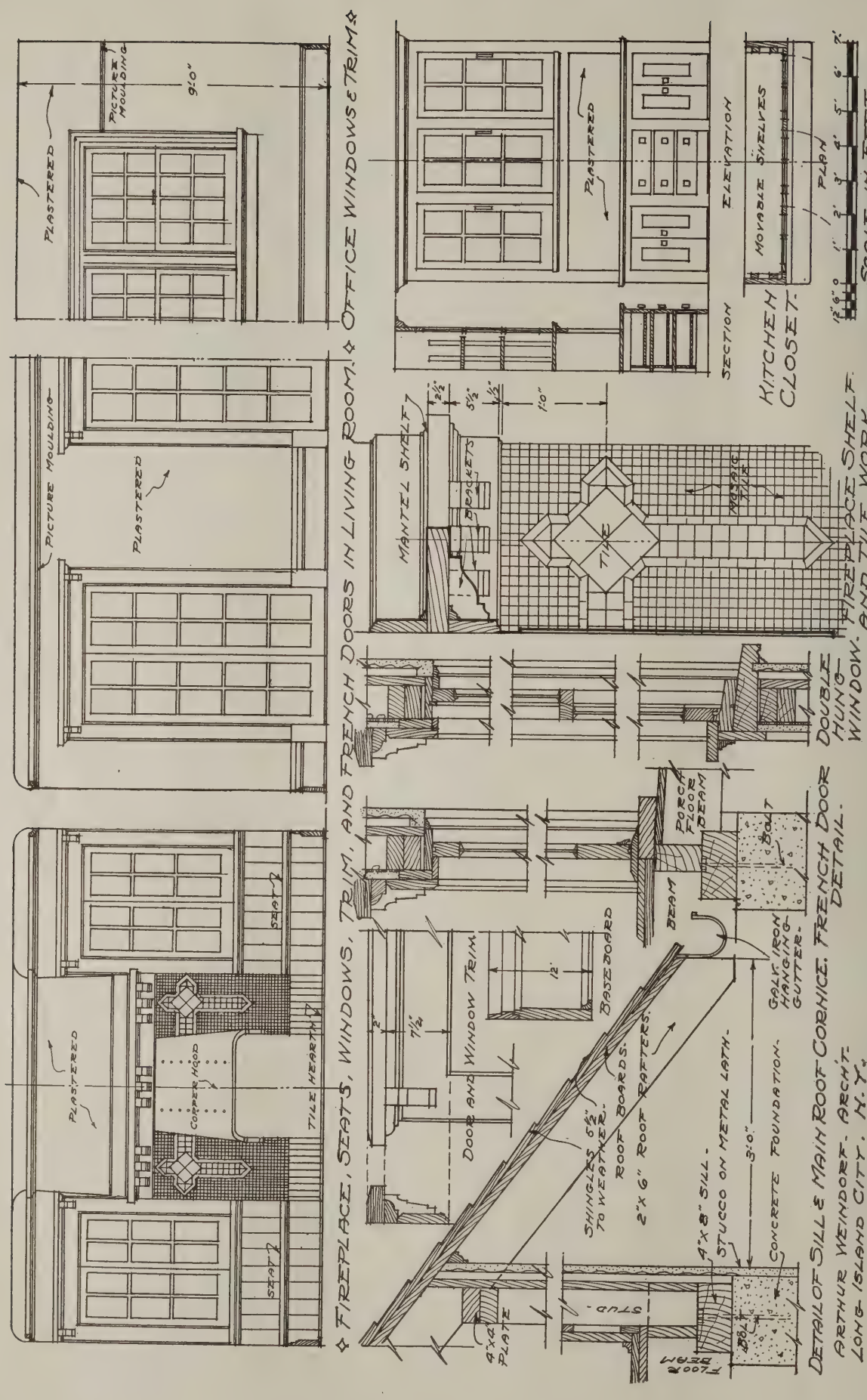


THE COTTAGE TYPE OF FARM HOUSE WITH STUCCO EXTERIOR AND PERGOLA ENTRANCE.



ARTHUR WEINDORF, ARCH'T.
LONG ISLAND CITY, N. Y.

PLANS AND ELEVATIONS OF FARM HOUSE OF COTTAGE TYPE SHOWN ON COLORED SUPPLEMENTAL PLATE



MISCELLANEOUS CONSTRUCTIVE DETAILS OF FARM HOUSE OF COTTAGE TYPE SHOWN ON COLORED SUPPLEMENTAL PLATE

used by the hired help. The men coming from the field enter the house by way of the rear porch which leads to a wash room, thus avoiding the necessity of their going into the kitchen and incidentally interfering with cooking operations. The men can go directly from the wash room to their quarters in the attic without passing through any other rooms. The wash room has opening out of it a large closet where the men coming from the field can hang their work clothes. On the opposite side is a toilet. The wash room is connected directly with the kitchen where the men are served with their meals.

The kitchen contains a large combination coal and gas range, a commodious sink and a closet. The dining table for the farm help can be used as a kitchen table upon which to prepare the meals.

The dining portion of the family living room is separated from the rest of it by means of a screen. When all the folks are home for the big dinners at threshing or thanksgiving time, the table can be extended in order to accommodate the members assembled. The porch can also be utilized for dining purposes if necessary, as it is connected with the living room by three large French doors.

The farmer's sleeping quarters and bath are separated from all the other rooms, as may be seen from an inspection of the floor plans presented herewith. There are three bed rooms and bath with large closet space and a coat closet in the hall. In the attic are located three bed rooms and bath for the farm help and for the servant, also two large storage rooms.

Opening from the rear entrance of the house and overlooking the farm is located the farmer's office. This is connected with the wash room and also opens out on to the main porch. The farmer can see from the windows all of the main buildings and can keep a check on the men as they come and go. The office is intended to be used for the transaction of various farm business and to keep a filing system as well as records of cost, for in these days farming is managed on a scientific basis and the "guessing method" is as useless as it would be in any other business.

The architect states that the cubical content of the house is 44,023 cu. ft., and he estimates the unit cost at 17c. per cubic foot. This, however, does not include the contractor's 10 per cent profit.

The architect of the farm house here illustrated and described is Arthur Weindorf, Long Island City, New York, or care of THE BUILDING AGE, 50 Union Square, New York City.

CAUSES OF EFFLORESCENCE ON MASONRY

METHODS FOR PREVENTING THE TROUBLE —HOW THE DEPOSITS MAY BE REMOVED

BY W. C. DUMAS

IT is not uncommon to see an otherwise excellent piece of brickwork or masonry marred by a scum of white efflorescence on the surface. Sometimes these deposits appear in the mortar joints. This is not only unsightly, but in some cases may positively endanger the strength of the work. The cause of these deposits is now fairly well understood, and several methods have been proposed for preventing their formation. The remedy must, however, be applied during the course of manufacture of the brick, or at the time of the mixing of the mortar.

The amounts of the salts which compose these scums vary between 0.001 per cent and 0.50 per cent. As little as one thousandth of 1 per cent can be seen on the surface of a brick. The maximum is about one-half of 1 per cent.

In most cases, these efflorescences are sulphates, but they may be almost any other soluble salt. Lime is the chief offender, and in the majority of cases the greater part of these deposits consists of sulphate of lime. Analysis show these residues to contain in addition to sulphate of lime, magnesium sulphate, potassium sulphate, sodium sulphate, and aluminum sulphate in lesser proportions.

Why do these salts form in certain cases and in other cases they do not? In the manufacture of brick, the principal materials used are water, clay and coal. All of these materials may contain impurities, which contribute to scum formation. The coal may contain a high percentage of sulphur, which during the burning process unites with the insoluble materials of the clay to form soluble salts to a greater or lesser extent. Afterwards, especially if the brick are used where they are exposed continually to moisture, the soluble salts are gradually brought to the surface by the capillary action of the moisture in the interstices and pores of the brick and then deposited on the surface as a scum.

The clays used in the manufacture of brick may contain soluble salts caused in them by weathering. This is often the case, especially if the material has been obtained near the surface where decomposition takes place faster. In the case of clays of this kind, future trouble can be avoided by first leaching out the soluble salts. A more expensive process is to add barium salts to the wet clay before molding.

Some waters used in the manufacture of brick and earthwares of all kinds carry much dissolved matter which is incorporated with the clay in the mixing. When the raw bricks are dried and burned and the water is evaporated, the chemicals contained in the water are left behind and may prove a troublesome source of scum formation. Such waters should be treated before they are used to remove the objectionable salts.

The drying and burning processes have much to do with the tendency of the product to form scums.

First, the drying must be steady and rapid, and condensation of moisture during this stage must not take place. Afterwards, thorough burning must be had in order to give a hard, compact brick, as well as to cause a partial combination of the soluble salts with the silica of the clay.

The causes and prevention of efflorescence in mortars are the same as those for brick. It is very essential to prevent the formation of scums in mortars because these deposits weaken the material in the mortar joints.

Many patents have been taken out for the prevention of efflorescence on bricks. Some of these patents call for the coating of the outer surface of the wall with some material impervious to water after the bricks are in place. Others of these patents provide various substances which are incorporated in the clays before they are burned. But the surest way to produce a sound product is to control the purity of all materials entering into its manufacture.

Occasionally the cause of the trouble is outside the brick itself. There is a case on record where a certain kind of sand-lime bricks showed a marked efflorescence. Upon examination, it was found that the materials used in the manufacture were free from soluble salts. Finally, the trouble was traced to the storage yards where cinders and ashes had been dumped. The sulphates and other soluble salts from them had been absorbed by the raw brick and were the cause of the trouble.

Efflorescent deposits can be removed from walls without much trouble. If the greater part of the scum is calcium sulphate, a dilute solution of hydrochloric acid consisting of one part of strong acid to five parts of water, will do the work. In certain other cases, the wall is first washed with a solution of hard soap consisting of two pounds of soap to the gallon. After this, it is washed with an alum solution containing one pound to the gallon.

PREVENTING LOSS BY FIRE

Insistence on the proper use of wood, as the best safeguard of the lumber industry, and as the best method of preventing loss and damage by fire is the text of the two latest technical bulletins issued by the engineering bureau of the National Lumber Manufacturers' Association from its Chicago offices. One deals with the general phase of building codes and the other with special problems of chimney, flue, smokepipe and fireplace. The bulletins quote largely from the recommendations of the National Board of Fire Underwriters, and in introducing the technical recommendations, the first one says:

From the standpoint of the lumber industry it is recognized that:

Dwellings are usually the least protected of any class of buildings, and when of flimsy, improper construction constitute an unnecessary hazard.

Wood in such cases is condemned, when actually the fault is not with the material, but with the careless construction and disregard of the fire hazard.

The cost of proper construction in relation to the fire hazard adds only a small percentage to the total cost of the dwelling; yet gives returns in lower insurance rates, and greater safety far in excess of the additional expense.

Intelligent selection of lumber to insure the proper kind and grade for the particular locations or different parts of a structure is essential.

With proper selection should come the consideration of strength of the different kinds of timber. In all cases careful workmanship in framing and placing is necessary.

A consideration of great importance is proper firetops or fire barriers in dwelling house construction. This is one of the actual protective measures which is not as generally known or recognized, but fully as important as safe chimney, smokepipe, and fireplace construction.

Frame dwellings are the most common type, and are not only represented by the millions of existing homes, but will continue to be built in the indefinite future. This is true for both economic and sentimental reasons. Wood remains the least expensive, most universally available, and the most adaptable material. At the same time it responds to architectural treatment in a way which introduces a strong appeal on the ground of beauty and sentiment.

The greatest progress towards fire protection will be made by incorporating in our ordinances and building codes proper safeguards, and by educating the people to the necessity of proper construction. To attempt to legislate wooden buildings out of existence is uneconomical and not the solution. Rather than this, simple and inexpensive safeguards which will not place an unreasonable burden on the builder, should be provided.

The Bulletin on chimneys introduces its safety recommendations with this pertinent phrase:

"It is unfortunately true that the general public which sees and feels the effect rarely appreciates the full importance of the cause. If a fire starts from a defective chimney or flue and burns a wood shingle roof, it would be more logical to pass an ordinance rigidly controlling the construction of flues and chimneys than one prohibiting the use of shingles. Since the burning shingle roof can be seen, legislation is directed against it, and not against the defective chimney which cannot be seen, yet which was the prime reason for the fire."

This Bulletin gives numerous illustrations showing how defective flues cause fires and how flues and chimneys should be constructed, this also being largely based on recommendations of the National Fire Underwriters.

PROPOSED LICENSE FOR BUILDERS

During the past few months several buildings have collapsed while under construction in upper New York City, and the need has been pointed out for some system whereby only capable builders would be lawfully allowed to erect structures. The real estate men of the city, following an analysis by experts of the Advisory Council of Real Estate Interests, are considering means by which this may be effected. The method advocated by Otto M. Eidlitz, the well-known builder, among others, is that "if the builders were licensed, and if the architect was made responsible for the supervision of the plans which he draws, a step would be taken in the right direction."

POLISH ON CONCRETE SURFACES

The amount of polish which can be given to the surface of concrete depends upon the density of the mixture and the nature of the aggregate used. After the surface has been smoothed down on a rubbing bed, or by the use of rotary rubbing stones, as applied in terrazzo floor work, the procedure is somewhat similar to that used in polishing granite or marble, says the *Canadian Engineer*. The aggregate exposed on the surface by the rubbing process takes the polish, the appearance of the surface being dependent upon the percentage of aggregate exposed.

A COMBINATION FARM AND DAIRY BARN

A WELL-PLANNED STRUCTURE INVOLVING MANY DETAILS OF INTEREST TO THE PRACTICAL BUILDER

THOSE of our readers who are interested in barn construction will doubtless find in the pictures and drawings here presented much to command their careful attention, as the building shown is in the nature of a combination structure for both farm and dairy purposes, consisting as it does of a regular stock barn two stories in height for the stabling of horses and the storage of hay, and a one-story addition arranged especially for cows. It is by no means a large affair, but rather a barn to meet the requirements of the average farmer in many sections of the country and particularly in the eastern and New England States.

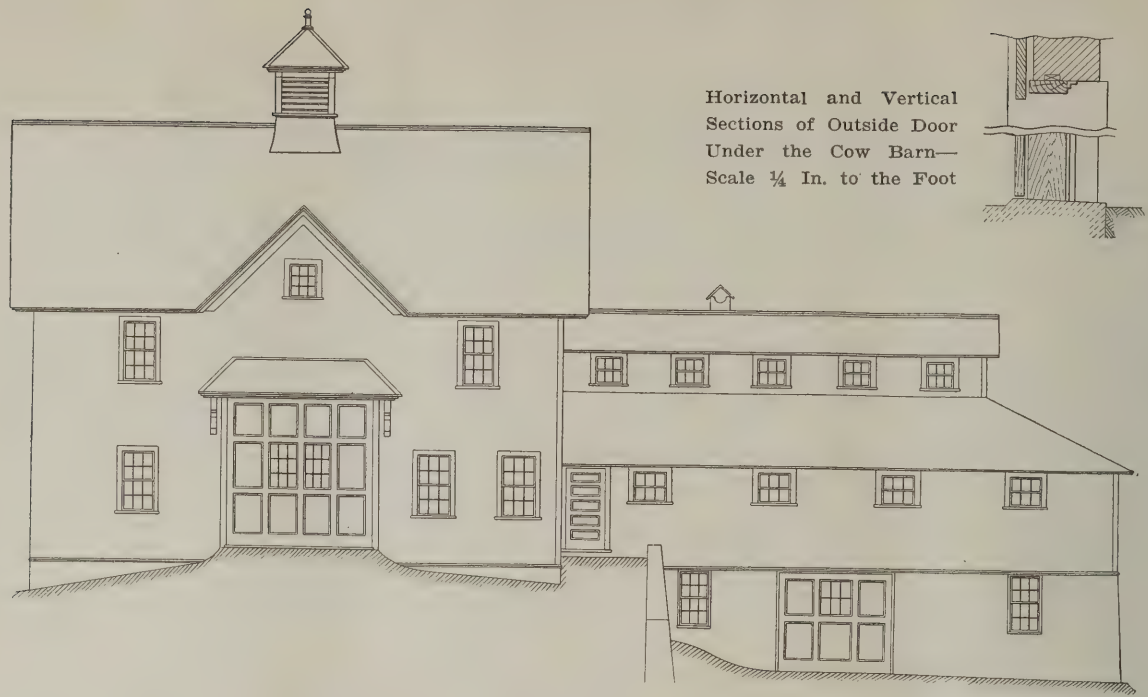


COMBINATION BARN OF LOUIS H. BUCKLEY NEAR WORCESTER, MASS.—ARCHITECTS, JOHN P. KINGSTON & SON, OF THAT CITY

The halftone engravings represent front and rear views of the barn, one showing some of the dairy stock in the yard and others the bold effects produced by the use of field stone for the basement walls. The many details afford an excellent idea of the methods of construction.

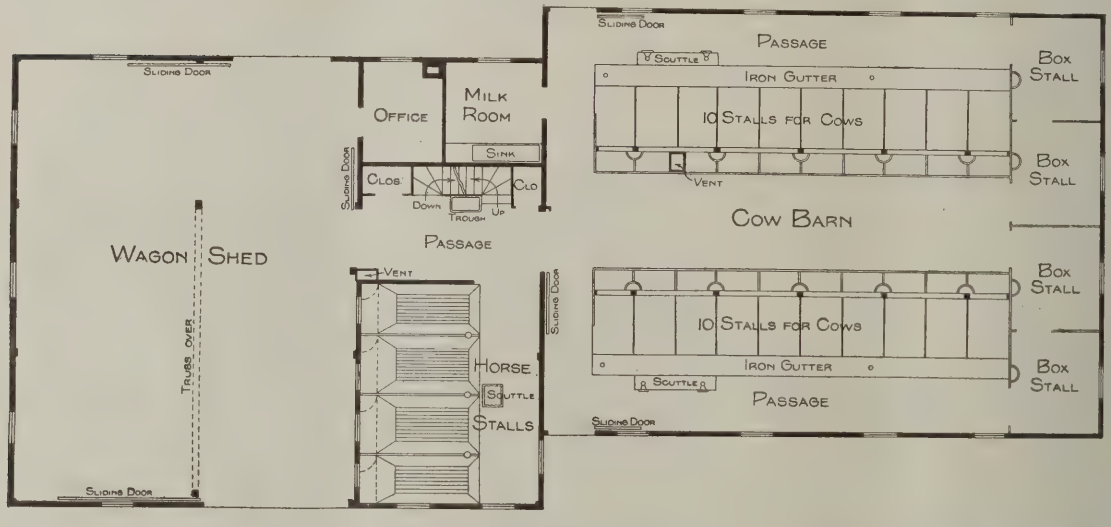
It is interesting to note that the cellar does not extend under the entire area of the stock barn for the reason that it is built on top of a ledge and there is ample space under the cow barn and horse stalls for such purposes as may be necessary.

The practical reader will note in connection with the framing that some of the braces are nailed in place instead of being framed in the usual manner, but from long experience the architects have found that this method is just as satisfactory as the other, for if by any means the braces become loose it is easy to drive them tight in place again. It will also be seen that the braces on the outside walls are placed inside of the studs instead of putting them in first and then cutting the studs over. The architects call attention to the fact that there may be some things about the construction here shown that may not be altogether in accord with the views of the readers, as, for example, nailing in the top ends of the studs instead of a tenon and the method of placing 2-in. plank braces from main

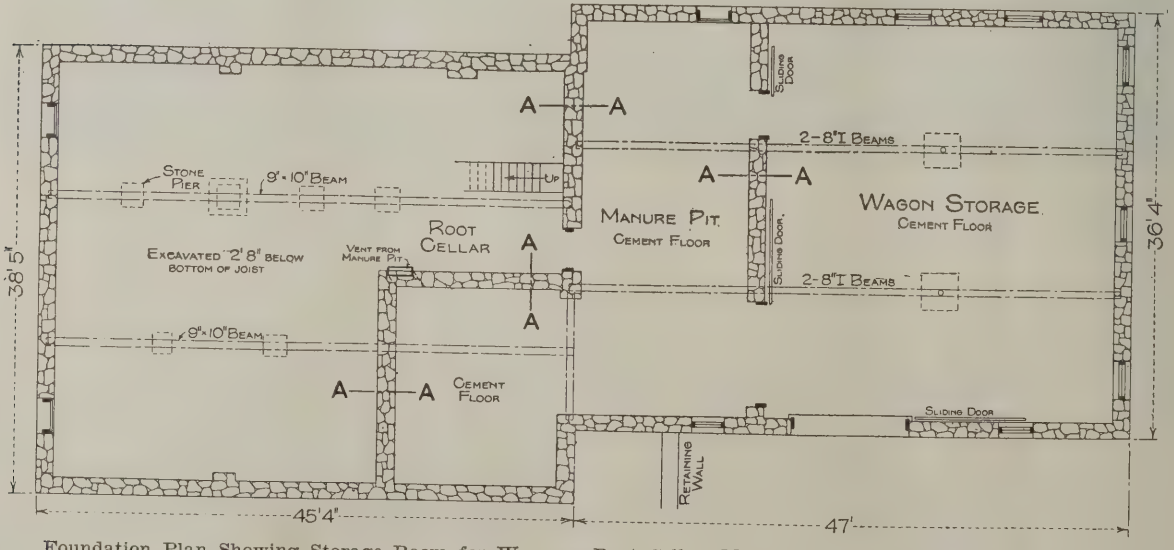


Horizontal and Vertical Sections of Outside Door Under the Cow Barn—Scale ¼ In. to the Foot

Front or South Elevation of the Barn—Scale 1/16 In. to the Foot



First Floor Plan Showing Position of Stalls, Wagon Shed, Office, Milk Room, Etc.—Scale 1/16 In. to the Foot



Foundation Plan Showing Storage Room for Wagons, Root Cellar, Manure Pit, Etc.—Scale 1/16 In. to the Foot

PLANS, ELEVATION AND DETAILS OF CONSTRUCTION

plate to the cross braces. As to the first, the architects have long since exploded the idea that there is such an amount of hay pressure on the walls of a barn as to require any unusual strength and that it is much easier to first put up the large timbers of the building and then the studding afterward as can be done in this way. In regard to braces, the architects state that they cannot be put in as usual owing to the fact that the timbers do not come on a line, and in their opinion a much stronger building is obtained by keeping the cross girts below the plate with large tenons in the posts than would be the case if the girts connected with the side of the plate for then the girt and the post



VIEW OF COMBINATION BARN, SHOWING THE FIELD STONE FOUNDATION AND THE RETAINING WALLS

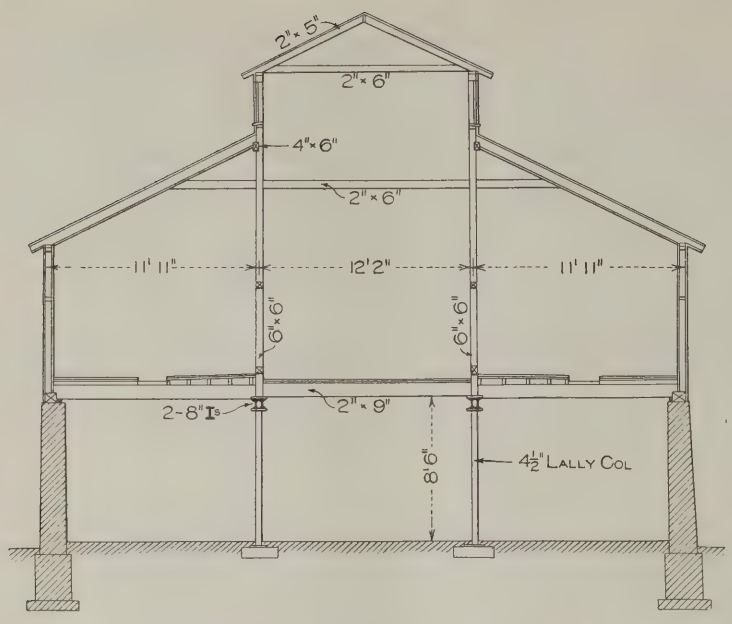
tenon would conflict and one or the other would be so short as to render it of no account. On the other hand, the plank braces if well fitted and fasened in place answer every purpose for a barn of this kind.

The aim of the architects has been to secure a good strong, fairly light-timbered building with as little framing or cutting to pieces of the material as possible and at the same time an easy one for the workmen to put together.

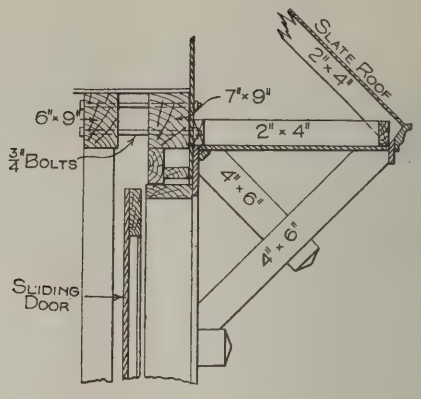
The foundation walls under the stock barn are 2 ft. thick at the bottom, and 1 ft. 6 in. at the top. The walls under the cow barn are 2 ft. thick, resting on a 3-ft. bed stone 6 in. thick. The division walls around the manure pits are also 2 ft. thick at the bottom and 1 ft. 3 in. at the top. The retaining wall outside, and shown in one of the pictures, is 3 ft. thick at the bottom and 1 ft. 6 in. at the top. The walls of the cow barn and those surrounding the manure pits above the cellar bottom, as well as the retaining walls, are laid up in cement mortar composed of two parts Portland cement, one part lime and three parts sand. The exposed parts of the walls outside are done with the best field stone having joints pointed up in Portland cement. The top of the retaining wall is covered with Portland cement 2 in. thick.

The cellar has a cement floor consisting of a 2½ in. base of cement concrete and a wearing surface ¾ in. thick. The base consists of one part Portland cement, three parts clean coarse sand and six parts gravel, thoroughly tamped in place. The wearing surface consists of one part Portland cement and two parts sand.

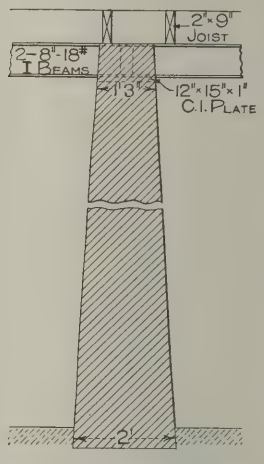
The frame work is of the style usual for such a building, the sills being 6 x 8 in., the first floor girders of the stock barn 9 x 10 in., and the supporting girders under the floors of the cow barn are made of two 8-in. steel I-beams. The first floor joists in the center bay of the stock barn are 3 x 9 in. and in the side bays 2 x 9 in. The two large joists under the stalls are 5 x 9 in., the joists in the cow barn and the second floor joists in the stock barn 2 x 9 in., the outside girts, second floor, 7 x 7 in., and the inside girts 7 x 8 in. The main plates are 6 x 8 in., the purlins 6 x 7 in., all outside studding 2 x 4., and the rafters 2 x 6 in. The cross ties at each post in the cow barn are 2 x 6 in., and the



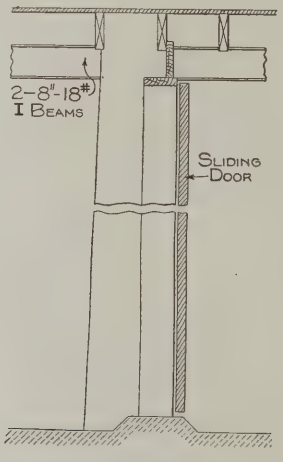
Vertical Cross Section of the Cow Barn Showing Sizes of Framing Timbers—Scale 3/32 In. to the Foot



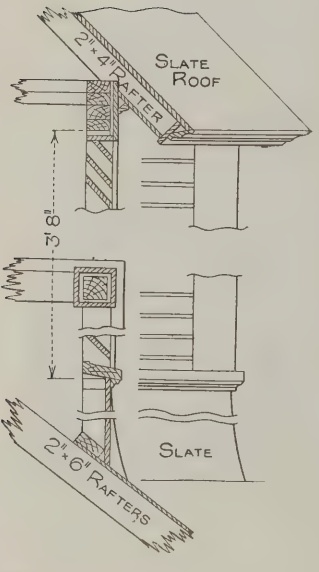
Section Through Top of Door and Hood—Scale ⅜ In. to the Foot



Section Through Basement Wall on Line A-A of the Plan—Scale ¼ In. to the Foot



Section Through the Sliding Door of Manure Pit—Scale ¼ In. to the Foot

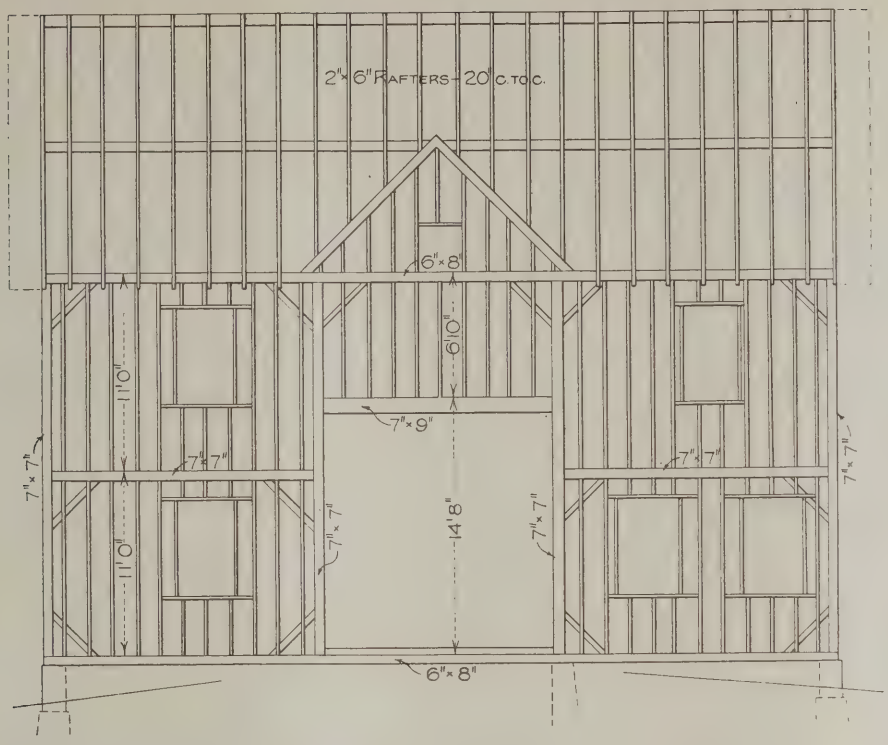


Section Through Ventilator on Horse Barn—Scale ⅜ In. to the Foot

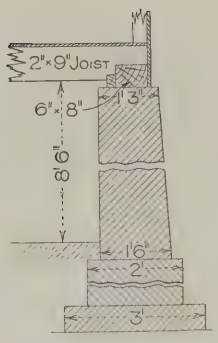


The North or Rear Elevation, Showing Location of Windows and Doors—Scale 1/16 In. to the Foot

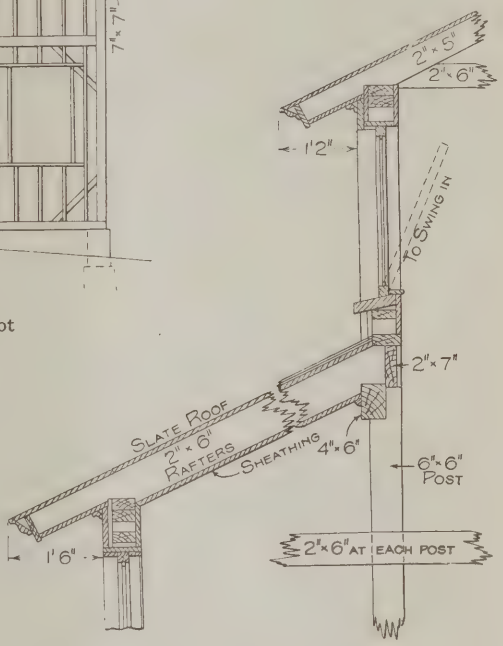
ELEVATION, SECTION AND MISCELLANEOUS CONSTRUCTIVE DETAILS



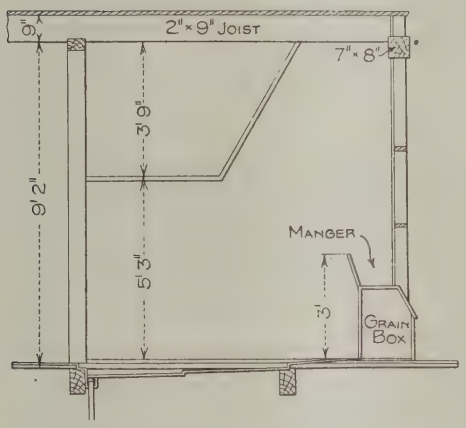
Framing of Front Elevation—Scale 3/32 In. to the Foot



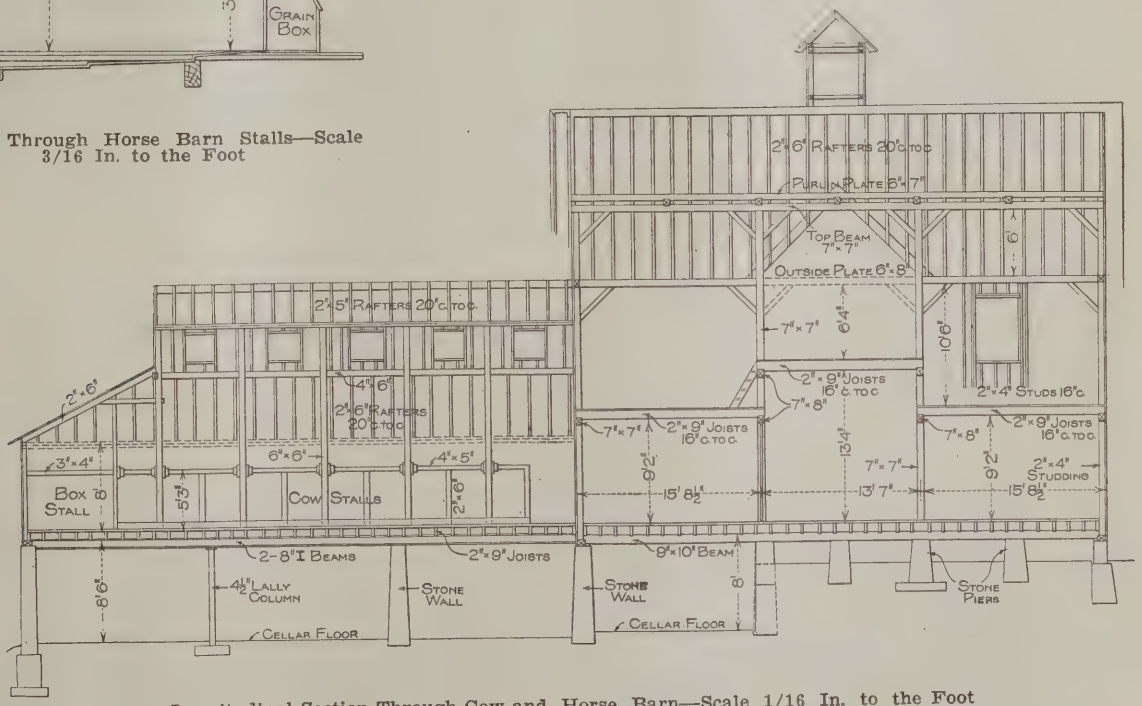
Section Through Wall Under Cow Barn—Scale ¼ In. to the Foot



Section Through Main Cornice of Cow Barn —Scale ⅜ In. to the Foot



Section Through Horse Barn Stalls—Scale 3/16 In. to the Foot



Longitudinal Section Through Cow and Horse Barn—Scale 1/16 In. to the Foot

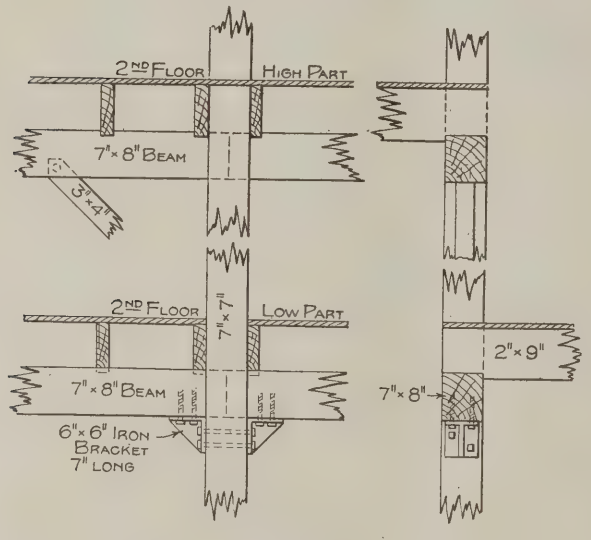
FRAMING ELEVATIONS AND MISCELLANEOUS CONSTRUCTIVE DETAILS

beam over the horse stall posts measures 4 x 6 in.

The outside posts are full length and have a tenon at the bottom the full width of the timber, 2 in. thick and 2 in long. There is also a tenon at the top the width of the timber 2 in. thick, 3½ in. long and fastened to the plate with a draw pin. The end posts have a tenon 4½ in. wide, 2 in. thick and 3½ in. long and fastened to the timbers with one draw pin. The inside posts have a tenon 2 in. thick and 2 in. long and set on top of the girders. The top end has a 7 x 2 x 3½ tenon and is fastened to the beam with a draw pin. The outside studs have a 2 x 2 in. tenon at the bottom ends to set into the sills and girts. The top ends are nailed in place.

There is a truss over the openings at right angles to the joists. The latter are bridged once between bearings with 1 x 3 in. stock. Partitions are constructed with 2 x 4 and 2 x 3 in. studding placed 18 in. on centers.

The exterior frame work is covered with matched spruce boards ⅞ x 9¼ in. wide dressed on one side. These are covered with sheathing paper



Various Details of Floor Construction—Scale ⅜ In. to the Foot

over which are placed 16-in. spruce clapboards exposed 4½ in. to the weather.

The rafters are covered with ⅞ x 9¼-in. matched spruce boards which carry a layer of tarred roofing paper well lapped at all joints. This in turn is covered with 10 x 18 in. sea green slate. The slate on the roof over the doors is 8 x 12 in., each slate being fastened with two 1¼-in. Swedish galvanized iron nails. The ridges have zinc roll. Sides of ventilator are covered with dark slate.

The whole of the first story except the central portion of the stock barn has a lining floor of No. 2 matched ⅞-in. spruce boards. The center portion of the stock barn has a lining floor of No. 2 matched 1⅛-in. spruce boards. The whole of the second story or hay bays in the stock barn has a single floor of No. 2 matched ⅞-in. spruce boards laid as tight as possible to the studs. The top floors in the whole of the first story, except otherwise specified, are of 1⅛-in. square edge planed and jointed spruce flooring not more than 7 in. wide. The milk room and office have a top floor of ⅞-in. spruce not more than 6 in. wide.

The sash are glazed with second quality single thick American sheet glass and are hung with cast-iron weights and Samson sash cord. The sash in the cow barn are 1¼ in. thick, made to slide sidewise. The sash at the top in the monitor roof are 1¼ in. thick hung at the bottom with two hinges, and have proper fixtures and cords to open and close from the floor below.

The sliding doors of the first floor have a jamb made of 2-in. stock and hardwood thresholds 3 in. thick. The large outside doors have a frame of 2-in. stock having chamfered stiles, rails, etc., with ¾-in. sheathing on the back and stationary sash as shown. Doors are hung to slide at the top with approved sliding door hangers. The doors in the cow



End Elevation—Scale 1/16 In. to the Foot

barn are 1¾ in. thick with heavy panels and chamfered edges. These are hung at the top so as to slide sidewise.

The ventilator on the main barn is built with ⅞-in. ventilating slats, jambs and casings and has 2-in. stools.

The horse stalls are fitted with W. A. Snow & Co.'s steel stall basins 6 ft. x 2 ft. 6 in., having constructed with the basin resting over the lining heavy slatted floor hinged to lift up. The floor is floor, then there is a second or middle floor of ⅞-in. matched spruce furred up all around the outside 1 in. so as to pitch to the basin. It is tarred all over and has one thickness of one-ply Paroid roofing paper well lapped, and all parts connecting with the basins are filled with elastic cement. The top or finish floor is of 1⅛-in. spruce jointed at the corners, laid close and well nailed.

The cow stall floors are laid with 2-in. furring pieces over and fastened to the joist so as to raise the floor. The under floor is of ⅞ matched

spruce, and the top floor of 1⅛-in. square edge spruce. The floor toward the outside has two pieces on top of joist to raise the floor up 3 in. on the outside and 2 in. inside. The lining floor is of ⅞-in. spruce and the top floor is of 1⅛-in. square edge spruce.

The cow stalls are fitted with swivel wood stanchions and individual drinking basins with running water.

The low space between the stall floors and the portion next to the outside wall has an iron cow stall gutter 18 in. wide by 3 in. deep at the highest part and graded to pitch from each end toward the center about 1¼ in. with outlet at that point.

The manger is made with a bottom and front of 2-in. plank, while the feed boxes underneath are of matched spruce boards and have a cleated lid or door hung with fasteners. The stall partitions separate each grain bin. Each stall has an iron hay rack with six ⅝-in. iron bars 3 ft. high, put up as shown in the details.

The vent shafts are made with a 2 x 3 in. piece in each corner and then covered outside with matched spruce boards. The vent from the horse manure pit connects through the wall as shown, is then carried straight up to the roof, and over and up to the cupola. The one in the cow barn is carried up to and through the roof about 1 ft. with



FRONT VIEW OF THE BARN OF LOUIS H. BUCKLEY—ARCHITECTS, JOHN P. KINGSTON & SON, WORCESTER, MASS.

The outlets from the iron troughs or gutters are drained through iron soil pipe to the manure pit located under the horse stalls and part of the cow barn cellar. The pit is entirely inclosed with a stone wall, has a cement floor and is ventilated up through the building to the cupola on the roof.

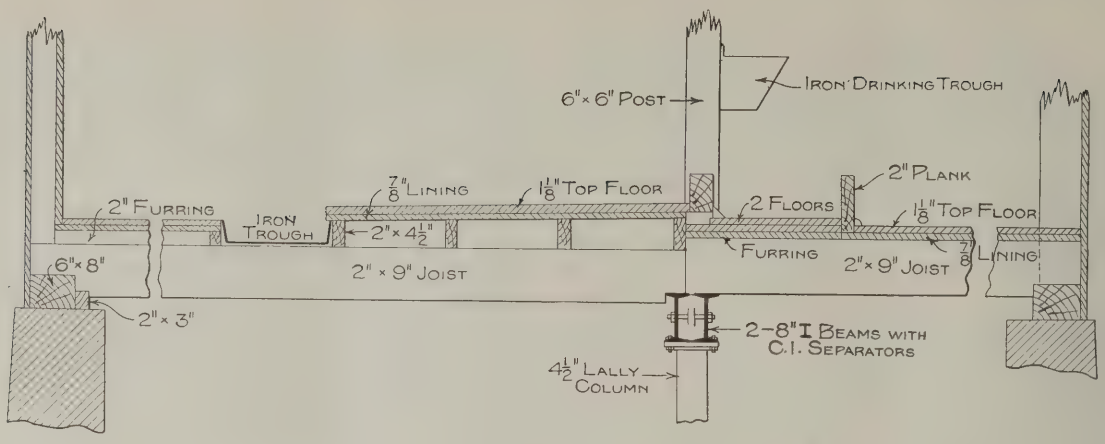
The horse stalls have 6-in. round hard pine posts with grooved portion to receive plank of 1¾-in. spruce, matched and planed. The partitions are 5 ft. high and slant off toward the height of the stalls as shown, with a piece of 2 x 3 in. stuff nailed at the ends. Each side of the plank at the head of the stalls has a 1⅛ x 2 in. strip to hold it in place. The partitions at the head of the stalls are of 2 x 4 in. studs boarded both sides with spruce boards down to the top of the grain boxes.

wood. The remainder is made of galvanized iron well braced and the top is well fastened to the woodwork so as to give it proper rigidity.

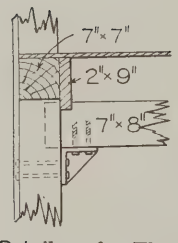
The feed bins in the cow barn are made with a 2-in. plank projecting above the floor at least 8 in., the parting being 2 in. thick.

The partitions around the milk room, the office and the closets are made with 2 x 3 in. studs, while those inclosing the box stalls in the cow barn are built with 2 x 4 in. studs, placed 18 in. on centers, one side being inclosed with matched and planed spruce boards. The partitions are 5 ft. high.

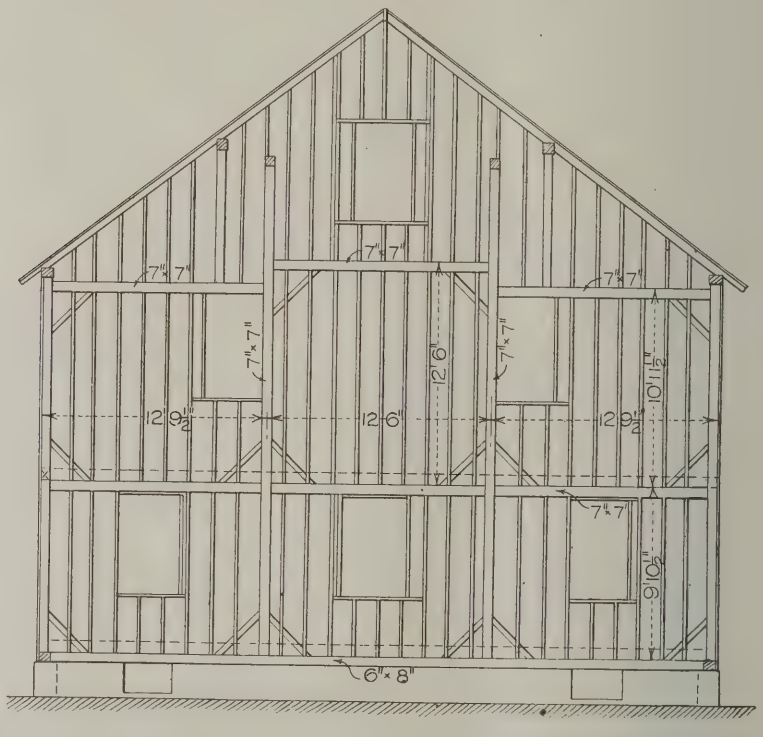
The walls of the partitions at the east side of the center bay, up to the top of the second floor, the walls and ceiling of the horse stall room, passage, office, milk room and all the exposed parts of



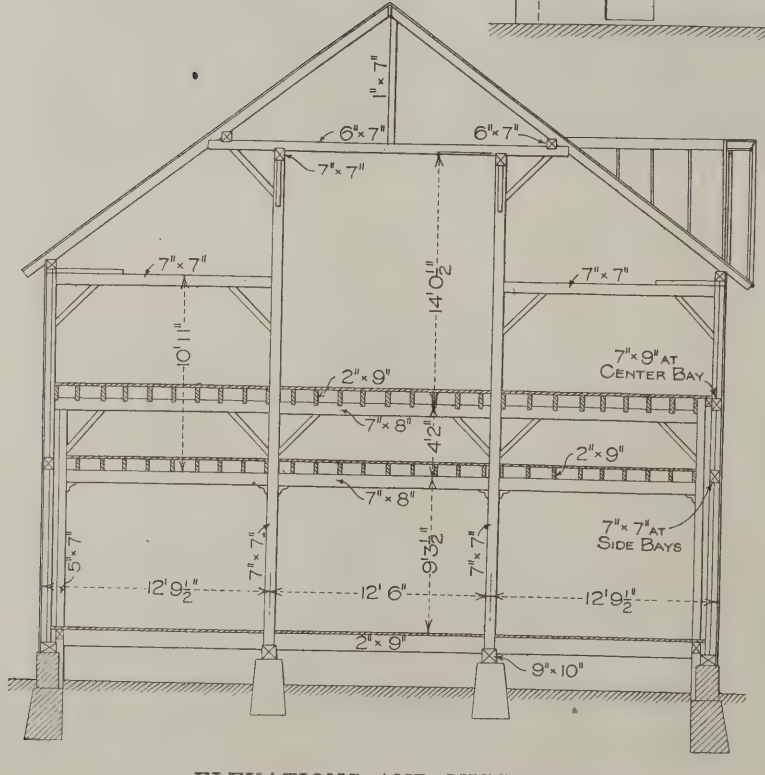
Cross Section of the Floor Under the Stalls in the Cow Barn—Scale ⅜ In. to the Foot



Detail of Floor Construction in the Stock Barn—Scale ⅜ In. to the Foot



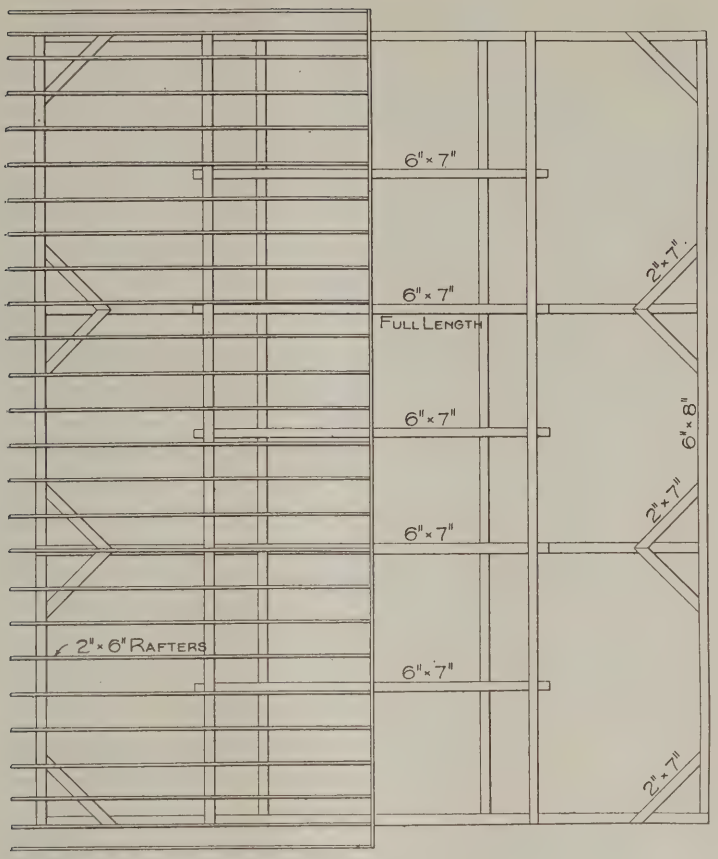
The Elevation Above Shows the Framing of the West End Elevation—Scale 3/32 In. to the Foot



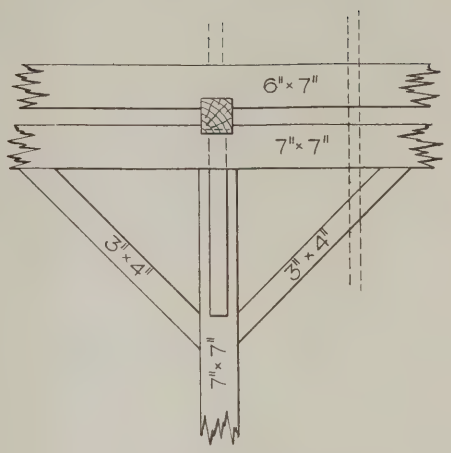
At the Left is a Vertical Cross Section of the Stock Barn Showing Sizes of the Framing Timbers, Joists, Purlins, Etc., also Spans with Heights of Stories

Scale 3/32 in. to the foot

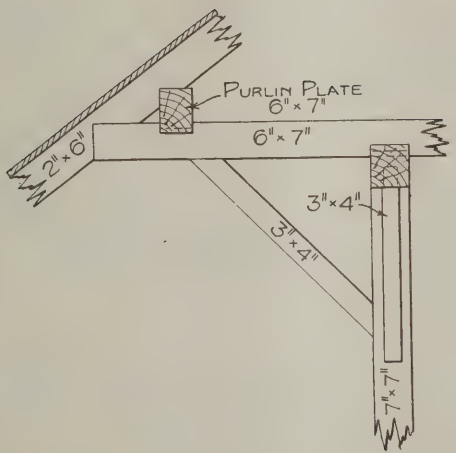
ELEVATIONS AND MISCELLANEOUS DETAILS OF CONSTRUCTION



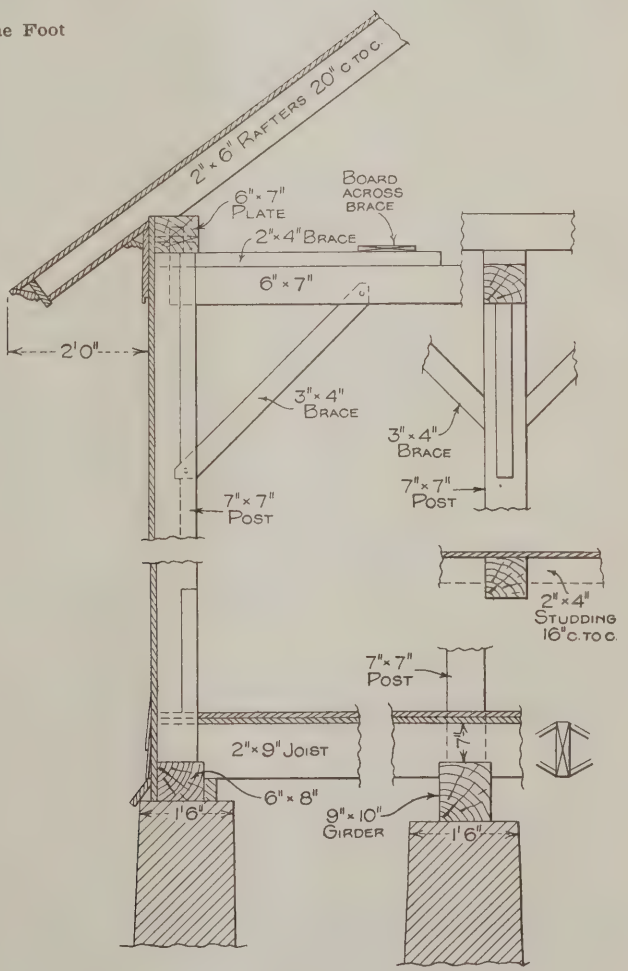
Framing Plan at Top of the Plate—Scale 3/32 In. to the Foot



Detail of Brace and Post Framing—
Scale ⅜ In. to the Foot



Details of the Framing at the Purlins in
the Stock Barn
Scale ⅜-in. to the Foot.



Various Details of Construction—Scale ⅜ In. to
the Foot

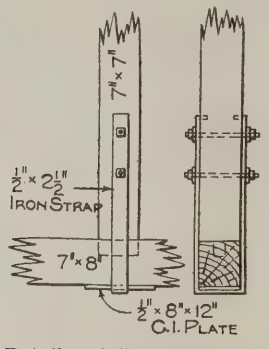
FRAMING PLAN AND MISCELLANEOUS DETAILS OF CONSTRUCTION

the cow barn from the floor up on walls and rafters to the top of the plate of the monitor room, are sheathed with No. 2 matched and planed ⅞ x 8 in. spruce boards laid close together.

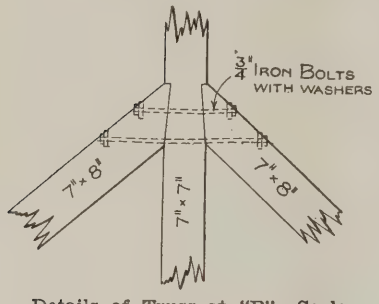
All the interior doors and side doors, including the cellar, were given two coats of paint and the inside of sash one coat.

The barn here shown was built for Louis H. Buckley in Nelson Place, Worcester, Mass., in accordance with plans and specifications prepared by architects John P. Kingston & Son, 508 Main Street, Worcester, Mass.

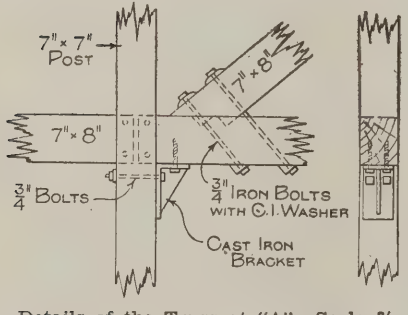
The contractor executing the work was Urgel Dorais, 3 Exeter Street, Worcester, Mass.



Details of Truss at "C" of the Elevation Below—Scale ½ In. to the Foot



Details of Truss at "B"—Scale ⅜ In. to the Foot



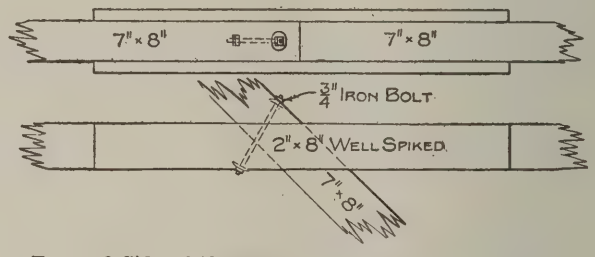
Details of the Truss at "A"—Scale ⅜ In. to the Foot

BUILDING CONDITIONS ON THE PACIFIC COAST

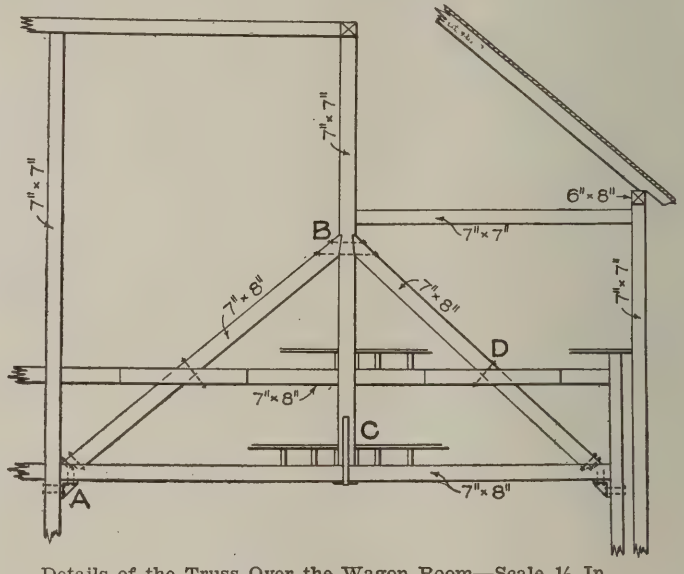
Our correspondent, writing under date of Oct. 5, says: While official building records in San Francisco are small as compared with a few years ago, there is considerable work going on in the down-town district, and contractors, as a rule, are keeping fairly busy. Prices of materials, especially steel and hardware, plumbing goods, etc., prevent much speculative activity in office buildings or hotels, and last year's preparation for the Exposition crowds left the city with abundant living accommodations. Dwelling work in the suburbs, however, is reviving, with evidence of a reaction from "cliff-dwelling" in down-town apartments. Work for large corporations is an important factor, as several are having good-sized office buildings erected for their own use, and many are working on modern manufacturing plants and warehouses either here or across the Bay.

Labor conditions are rather unsettled, and the structural steel shops are, for the most part, running on an "open-shop" basis, their work being greatly hampered. The waterfront trouble is no longer affecting the lumber market, as most lumbermen are handling their cargoes with stevedores furnished by a company in which they are all interested, employing non-union help.

Many corrugated iron warehouses are usually



Top and Side of Truss at "D"—Scale ⅜ In. to the Foot



Details of the Truss Over the Wagon Room—Scale ⅛ In. to the Foot

MISCELLANEOUS CONSTRUCTIVE DETAILS

"Strength of Webs of I-Beams and Girders" is the title of Bulletin No. 86 of the Engineering Experiment Station, University of Illinois. The matter contained therein has been prepared by Herbert F. Moore and W. M. Wilson, who present much valuable information along the lines indicated.

built through the country in September to house the crops, but this year other materials have been largely substituted, the cost of galvanized iron being almost prohibitive. Bars jobbing at about 4c. per lb., and wire-reinforcing fabric correspondingly high, tend to discourage concrete construction; but it is nevertheless being used quite largely, as fabricated steel is even more expensive. Cement, rock and sand show little fluctuation.

Lumber prices have been comparatively low, but the northern mills made an advance on fir, especially uppers, the first of the month, owing to a marked increase in demand, many mills and yards having less than normal stocks.

An interesting phase of the lumber situation is the heavy demand in South Africa, Australia, South America, etc., which, from lack of ships, is leading Pacific coast lumbermen to build many wooden vessels for this traffic. The type most popular is a five-masted schooner of about 2,000,000 board ft. capacity, with Diesel-engine power. At least half a dozen such vessels are building on San Francisco Bay, and many more than that at Astoria and St. Helens, Ore., and some on Puget Sound. Carpenters who understand marine work are in demand, and those at San Francisco recently received an advance in wages.

This has been a good year for the brick and terra cotta industry, the cost of other materials tending to turn the demand in this direction. Common brick has held steady at $10 per m. on the job in San Francisco, which is higher than a few years ago, but not excessive; and many yards have been running at capacity on large contracts. Texture brick for facing is very popular.

THE CHICAGO CEMENT SHOW

Announcement has been made that the Tenth Annual Cement Show will be held in the Coliseum and Balcony in the city of Chicago, Ill., on Feb. 7 to Feb. 15, inclusive. The concentration of exhibits in the Coliseum balcony and annex will enable visitors to conveniently make inspection of them, while at the same time machines and products will be closer together, thus facilitating comparison and enabling prospective purchasers to make their selections more expeditiously.

It is now expected that there will be a joint exhibit of cement companies similar to the one at the show early this year. This last exhibit was regarded by visitors as the most complete and comprehensive display of the uses of concrete ever presented to the public. It is, however, planned to make the coming exhibition even more comprehensive and to show to as large an extent as possible products in the making.

During the eight-day period, Chicago will be the center of activity in the building material industry. The National Builders' Supply Association will hold its annual convention at the Hotel Sherman, Feb. 11 and 12, and the Illinois Lumber & Builders Supply Dealers' Association at the same hotel, Feb. 13 and 14. It is also likely that the American Concrete Institute will meet during the progress of the show, also the American Pipe & Tile Association and possibly the American Association of Engineers.

It is pointed out by the management of the Cement Show that closing the affair on a Thursday will make it unnecessary for the exhibitors to be away from home more than one Sunday. Since only the Coliseum and Annex will be used for display purposes it is probable the demand will exceed the available space and it is suggested that those desiring to exhibit should make early application for space.

CORRESPONDENCE COURSE IN LUMBER AND ITS USES

Architects, teachers of manual training, lumbermen and manufacturers of wooden materials are taking advantage of the correspondence course in Lumber and Its Uses, offered by the Department of Forest Utilization in the New York State College of Forestry at Syracuse. So many of our valuable woods, which were so plentiful up to ten or fifteen years ago, are rapidly being depleted, and so many new woods of both native and foreign origin are coming into our markets that it is becoming necessary to become acquainted with these new woods, together with their character, technical qualities and uses. The college announces a course in Lumber and Its Uses and Wood Utilization, to be held next winter in the new College of Forestry Building at Syracuse University.

LAUREL FOR INTERIOR FINISH

California laurel, suitable for interior finish, is now being placed on the market in considerable quantities, as some large tracts of this timber have been opened up by the new railroad into Humboldt County. It is at present offered in San Francisco at $60 per M ft., about the same as clear Oregon pine finish, and much cheaper than other hardwoods, which makes it very attractive to the builder, writes our San Francisco correspondent.

The laurel lumber, when properly cured, is very hard, firm and fine-grained, of a rich yellowish-brown color, sometimes beautifully mottled. It is especially good for staining to imitate mahogany and is finished in that color in many homes now being built.

Dimension timber of laurel is being used for keel blocks in the new Union Iron Works drydock, owing to its ability to stand great pressure without splintering.

HEAVY DEMAND FOR BARN MATERIALS

Lumber dealers doing business in the vicinity of Carlisle, Ky., report the demand for barn material to have been the heaviest for years, and carpenters say that more barns are being erected in that county than for several seasons. All new barns are being rushed to completion to take care of the tobacco crop.

MODERN FARM BUILDINGS UNDER ONE ROOF

AN EXTERIOR FINISHED IN STUCCO WITH THE INTERIOR COMPACTLY ARRANGED

THE subject of the accompanying colored supplemental plate is a barn which has been designed with a view to keeping under one roof the various buildings which are usually scattered over a considerable area, and which are separate and distinct. This arrangement of combining all the buildings in one will save many steps that are usually spent in going from one structure to another, and at the same time it puts all the buildings under easy control. The cost of construction is reduced, as some of the usually required outside walls are not necessary, and there is also a saving in plumbing, lighting and foundation walls.

ARRANGEMENT OF BUILDINGS

This farm building has been arranged to provide sufficient space for fourteen cows, two calf pens, one bull pen, feed room for mixing feed, a 12-ft. silo, stalls for five horses, two box stalls, harness room, feed room for horses, two hay mows, a wagon room, garage, farm implement room in which space is set aside for a water-power plant, gasoline engine and dynamo to generate electricity to drive the stationary farm machinery.

The attic, which is located over the wagon room, garage and implement room, contains three large bed rooms and bath, designed to be used for the farm help.

At the rear of the barn and connected with it is a large poultry house with brooding and roosting rooms, while at the other end of the barn is an ice house and milk room.

The architect points out that the farm building has practically a fireproof exterior and partially fireproof interior, while the garage is of fireproof construction. The foundation walls and the entire floor of the building are to be of concrete mixed in the proportions of one part Portland cement to three parts sand and five of broken stones. The foundation walls are to be 12 in. thick and rest on footings 10 in. thick extending 6 in. on either side of the walls above. The foundation walls should be carried down below the frost line so as to avoid all danger in this respect.

THE FRAMING TIMBERS

The entire framing timbers are to be of spruce, the floor joists to be 2 x 12 in., the studding 2 x 6 in., the wall plates to consist of two pieces of 2 x 6 in., the upper and lower roof rafters 2 x 6 in., braces 1 x 8 in. and 2 x 6 in., and cleats 1 x 8 in. The studs, rafters and joists are to be spaced 24 in. on centers.

The side walls of the building, as well as the entire roof are to be covered with hemlock sheathing boards, over which is to be laid a waterproof building paper. Over the building paper on the exterior walls 1 x 2-in. furring strips are to be nailed 13 in. on centers, and these in turn are to be covered with composite metal lath, upon which the stucco is to be applied. On the interior the lath is to be applied directly to the under side of the floor joists and studding and given a smooth stucco finish which will enable the interior of the barn to be washed out with a hose. The roof is to be covered with asbestos shingles.

THE CONCRETE FLOOR

The floor is to be of concrete, 6 in. thick, and should be 6 in. or 8 in. above grade outside. The floor should never be lower than the ground level at the door, as it is better to have the live stock step up rather than down to the floor level, as in the latter case there is great chance of live stock slipping, especially when stepping down over a door sill onto a smooth concrete floor at a lower level.

A concrete approach with a ribbed surface should be constructed on the outside of the barn leading from the ground level up to the floor level, as this will prevent the live stock from stumbling and tracking much dirt. The stalls are to have a 4-in. wood block floor laid on 2 in. of sand, which is intended to act as a cushion.

The floor of the hay mow is to be of 1 x 9-in. matched and dressed pine.

The doors are to be built up of matched flooring and made double thick, with two thicknesses running at right angles to each other, so as to prevent warping. The building paper is to be placed between the two thicknesses, which will tend to make it an insulated surface. All doors are to be hung on extra strong hinges, and are to be provided with automatically fastening devices. All glazed doors are to be protected by a heavy wire mesh.

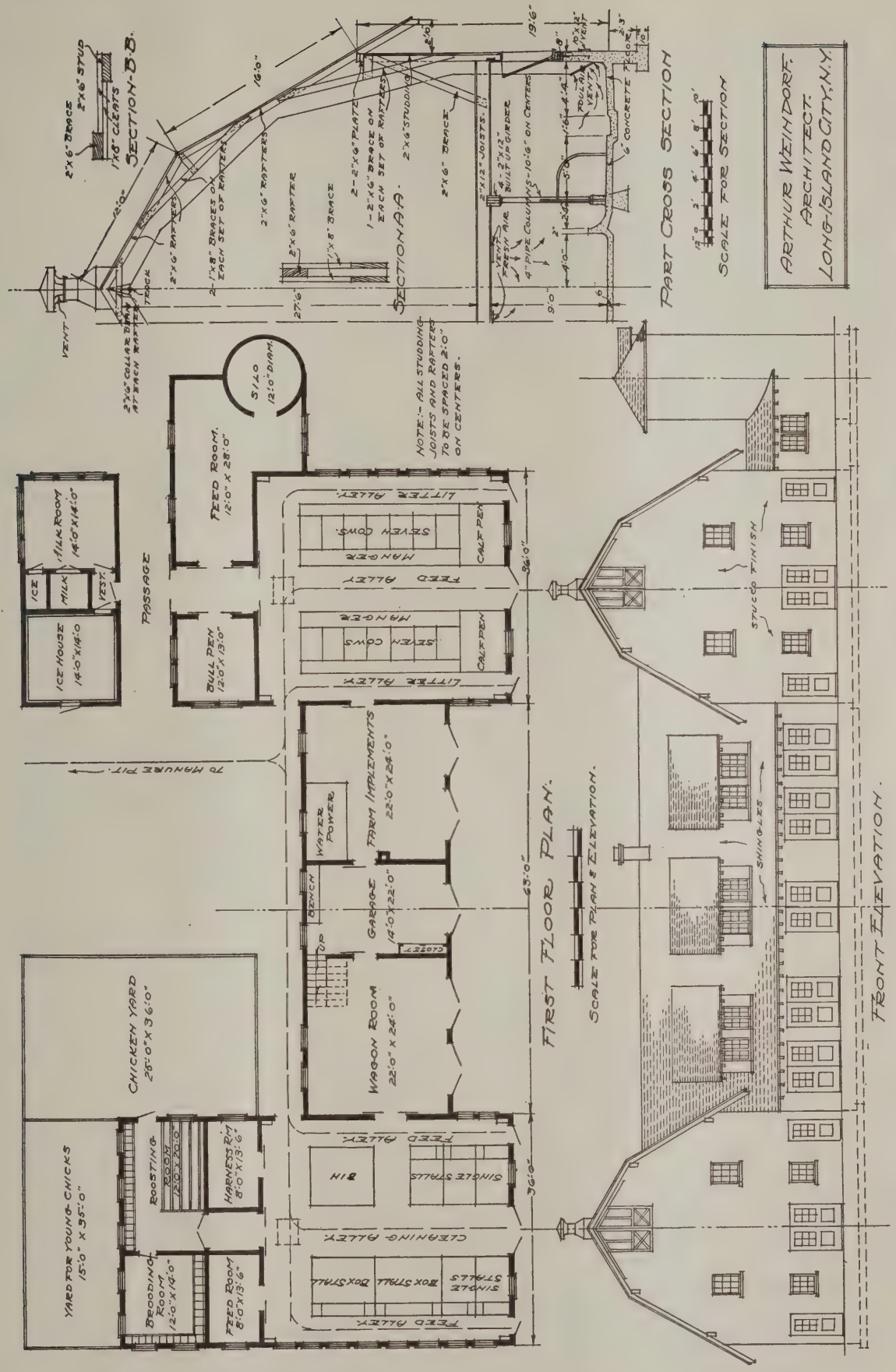
THE PROPER VENTILATION

The proper ventilation of the barn is very important from the standpoint of the health of the live stock. In this case, where the live stock face in, the fresh air flues are placed in the side walls of the building, starting just high enough from the ground on the exterior to prevent the snow from closing them up. The openings are also protected with wire mesh to keep out birds.

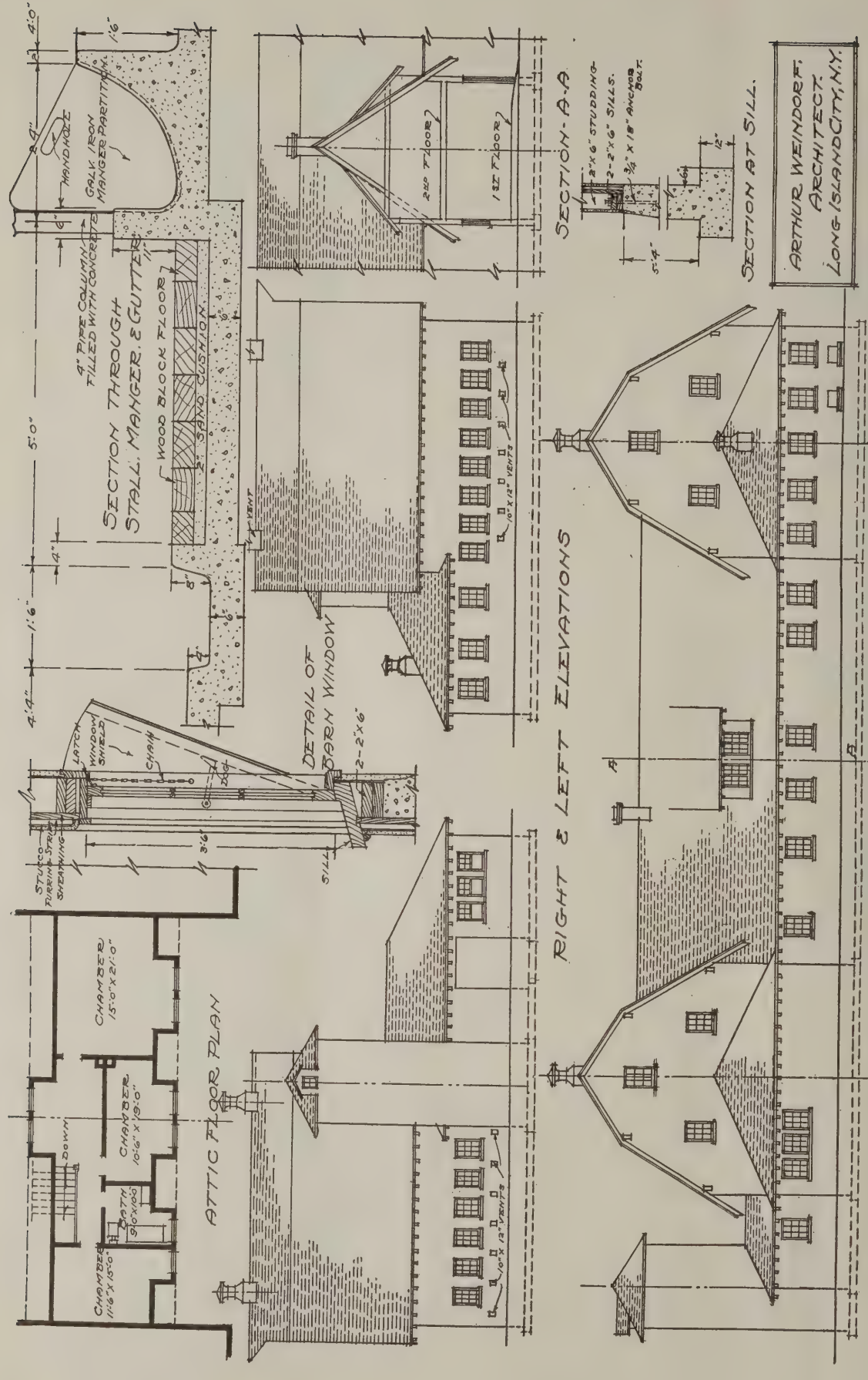
The flues are carried up inside of the exterior walls and between the ceiling joists to the center portion of the barn, where registers are located in the ceiling and in front of the live stock. The purpose of starting the fresh-air flues on the outside within a few feet of the ground is to trap the warm air in the stable. Warm air is lighter than cold, and therefore cannot get out through the intake flues. The air at the ceiling, being the warmest, the fresh air is gradually warmed as it ascends and the fresh air always reaches the noses of the live stock at the right temperature before passing over the gutter, and is drawn off by the outtake flues. The intake and outtake flues should



FRONT VIEW OF A COMBINATION BARN FOR A MODEL FARM WITH SILO IN THE BACKGROUND.



PLANS, ELEVATION AND CONSTRUCTIVE DETAILS OF MODERN FARM BUILDINGS SHOWN ON COLORED SUPPLEMENTAL PLATE



PLAN, ELEVATIONS AND MISCELLANEOUS CONSTRUCTIVE DETAILS OF FARM BUILDINGS SHOWN ON SUPPLEMENTAL PLATE

be so spaced and located that the fresh air will be thoroughly diffused, thereby preventing any drafts which would be detrimental to the live stock.

THE FOUL AIR FLUES

The foul air flues should start on the inside near the floors and terminate in flues above the roof.

An opening in the outtake flue should also be provided at the ceiling so as to remove excessive moisture.

All windows are to be built of pine and are to be so arranged with a wind shield that no draft will be created. The arrangement shown in the detail presented on another page tends to throw the air upward where it will mingle with the warmer air before coming in contact with the live stock. There are many types of barn windows and ventilating systems on the market, meeting almost any need.

An examination of the floor plan shows the relative position of the ice house to the dairy or milk house, and should be constructed in connection with a farm building, being of great convenience.

The ice house is to be thoroughly packed for summer, the ice and sawdust being put in through the side door which is so made that when shut it is practically air tight. When ice is wanted it is taken out through the door opening into what may be termed the vestibule.

THE ICE HOUSE

The ice house is built of hollow tile, starting from the top of a concrete foundation. The air chambers in the hollow tile serve as insulation and tend to prevent the heated air of the summer months from penetrating into the ice chamber. The interior walls are covered with a waterproof insulating board. The proper storing of ice depends on drainage and insulation and having a sufficient quantity of ice in one mass to preserve a temperature below freezing.

The poultry house should be built snug and comfortable, with plenty of light and ventilation, so that the hens will lay in mid-winter. The outside walls are to be built of 2 x 4-in. studs, resting on a concrete foundation. Composite metal lath is to be nailed on to the exterior and interior of the studs and the lath covered with stucco on the exterior and interior, where it is to be troweled smooth. This scheme will prevent vermin from finding any hidden places. The above arrangement will also allow for flushing out the poultry house with hose. All fittings are to be of the removable type, so that everything can be taken out into the sunlight for cleaning.

The garage walls are to be of concrete with a metal ceiling.

The exterior and interior of the barn requires very little painting. All that is to be done shall consist of three coats of pure white lead and linseed oil, and it shall be applied in clear weather.

The entire building is to be supplied with running water and the bath room is to contain an iron enameled tub, wash basin and water closet. The barn is to be properly drained to sewer or to septic tank. The lighting is to be by means of electricity.

The cost of a building of this nature will vary in different parts of the country, depending on the cost of material and labor. For this reason it can be constructed in some parts of the country for less than here estimated. A saving can also be made by using a cheaper exterior and interior construction, such as substituting wood shingles for the asbestos; novelty siding for the stucco exterior, and finishing off the interior with boards instead of stucco.

According to the estimate of the architect, the barn contains 167,940 cu. ft., and the unit cost is figured at 7 cents per cubic foot. He gives the cubical content of the two barns as 92,160 cu. ft.; of the building between the barns as 34,776 cu. ft.; of the poultry house as 13,608 cu. ft.; of the ice house and milk room 9720 cu. ft.; of the bull pen and feed room of 12,636 cu. ft., and of the 12-ft. silo, 35 ft. high, 5040 cu. ft.

Figuring the cost on the square foot basis, he computes the two barns and the building between at 4329 sq. ft., on which he estimates a price of $2 per square foot for the large buildings and $1.50 per square foot for the rear additions. He computes the poultry house, ice and dairy houses, bull pen, feed room and silo, at 2142 sq. ft., with a unit price at $1.50 per square foot.

The total cost, figured on the cubic foot basis, the architect places at $11,755.80, and on the square foot basis at $11,871.

The barn here shown was designed by Architect Arthur Weindorf with offices in Long Island City, New York, or care of THE BUILDING AGE, 50 Union Square, New York City.

LOS ANGELES BUILDING PRACTICE

The Master Builders of Los Angeles, Cal., who form a unit in The Builders' Exchange of that city, have under consideration a draft of a general Code of Practice which was referred to them by the directors of the Exchange. The proposed code is intended to standardize practice in regard to the letting of sub-contracts, etc., and is gotten up on somewhat similar lines to the code recently adopted by the Chicago builders.

The general building code drafted for Los Angeles last spring, which has been pigeonholed in the City Council since May, is coming up for action, and a public hearing was called Oct. 3. The provisions of the code that have already been provisionally adopted are said to have saved an appreciable amount of money for builders.

CINCINNATI'S BUILDING MATERIAL EXCHANGE

The Board of Directors of the Chamber of Commerce of Cincinnati, Ohio, has approved a plan for establishing as a subsidiary of that body a Building Material Exchange. The purpose is declared to be to promote the welfare of the city of Cincinnati and of the members of the organization.

BUILDING AGE

(Founded in 1879 by David Williams)

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Index to reading matter on page 17 of the advertising section of the paper.

NOVEMBER, 1916

Farm Buildings

The present-day tendencies toward greater hygienic and sanitary conditions on the modern farm and especially where dairy products are commercialized renders of more than passing interest the illustrations and descriptive matter which constitute the basis of our current issue. The builder who is called upon to erect the various structures found upon the up-to-date farm must necessarily consider the different phases involved in the work and it is with a view to affording him possible suggestions as to design and arrangement that the greater portion of this issue has been devoted to farm buildings. While frame construction is largely employed there is an increasing tendency toward the use of concrete, hollow tile and even sheet metal in the erection of the modern farm structures.

The results accomplished are in striking contrast to the ramshackle buildings which dotted the landscape in the rural districts in years gone by and which even now can be found in many localities. The tendency, however, is unmistakably toward better things and a better realization of the requirements of healthful conditions where farm buildings are used for dairy purposes. The growing favor of concrete has caused it to be used in connection with the construction of all kinds of buildings, its popularity being due in large measure to its permanence and to its low cost of maintenance in the way of repairs. In the building of the farm house, the various barns, the silo, the ice house, the piggery and the poultry house, concrete in some form is being employed with gratifying results the country over. In the case of many of the buildings, the walls are either of blocks or of reinforced concrete according to preference and circumstances, while in others, double concrete walls are utilized owing to the fact that these give an air space between which tends to render the structure cooler in summer and warmer in winter than would otherwise be the case. While the initial expenditure may be a trifle more than in that of frame construction, the lower cost of insurance, the minimum outlay required for repairs and the greater life of the work are items which in the long run make for economy and which the builder cannot afford to disregard.

Among the illustrated articles in this issue attention should be called to the excellent examples of buildings found on a model farm near Waukegan, Ill., where each is designed in accordance with its present and future requirements and where the individual needs of each structure were carefully considered. The drawings throughout are to convenient scale and presented in such a way as to render them of practical value to the builder while the pictures show the appearance of the completed structures. In the case of the combination farm and dairy barn near Worcester, Mass., the various details are, from the standpoint of the builder, more than ordinarily complete and therefore of special value to him. Another feature in this issue which is of striking interest and value is the article describing the first round reinforced concrete barn ever erected. The floor plan taken in connection with the numerous "progress" pictures serve to enlighten the reader as to the layout of the interior and to the manner in which the work was carried out. Just how sheet metal may be profitably used in connection with farm building construction is also exemplified in a way to prove of the greatest possible benefit to the practical members of the craft.

We feel sure our readers will be interested in the colored supplemental plates which accompany this issue, illustrating as they do two types of farm buildings and serving as excellent mediums for discussion by builder and client. The long winter evenings are rapidly drawing near when the farmer will take up for consideration the improvements and additions which the harvest has demonstrated to be necessary or desirable and the builder, with the current issue of the BUILDING AGE as a basis, can discuss design and arrangement of modern farm buildings in an intelligent and satisfactory manner well calculated to lead to good building contracts for execution when the spring season opens.

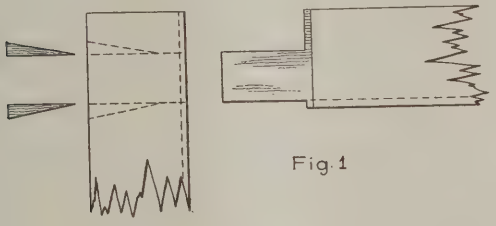
CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

WEDGING A HAUNCHED TENON

From W. H. C., Peoria, Ill.,—In looking over a paper published in London and devoted to the interests of the carpenter, I found an inquiry from a correspondent which possibly may interest some of the readers of THE BUILDING AGE and I am therefore enclosing a tracing of the sketch which appeared in connection therewith.

The inquirer asked which is the proper method



WEDGING A HAUNCHED TENON

for wedging a haunched tenon—that indicated in Fig. 1 or that shown in Fig. 2. He stated that a technical instructor teaching joinery made use of the method indicated in Fig. 2 declaring that it is the proper way to do the work. Old joiners, however, in the town in which the correspondent resided differed from the instructor and stated that the method shown in Fig. 1 was correct. Perhaps some of the American carpenters and builders will be interested in expressing an opinion in regard to which is the correct and which the incorrect method.

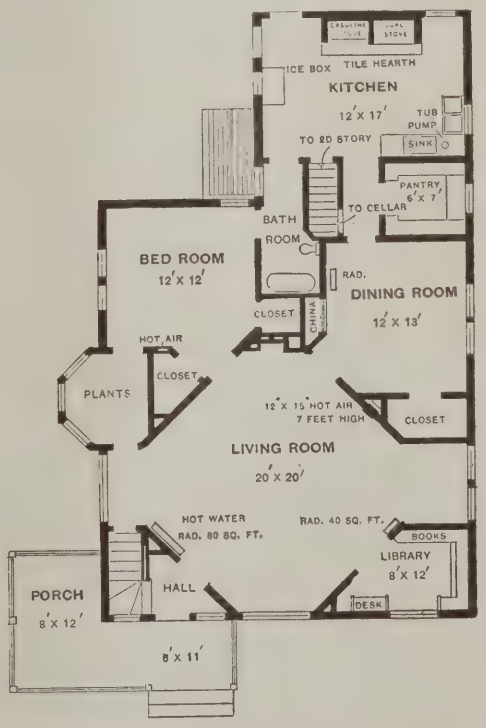
TEMPERING WOOD-WORKING TOOLS

From D. H. C., Oakland, Cal.—A carpenter asked me the other day for an easy method of tempering wood cutting tools, and after I had told him it occurred to me that the same information might be of interest to some of the readers of the correspondence columns, so I am giving it herewith.

Heat the chisels or plane bits or whatever the tools may be to a cherry red, then cool in cold water, after which polish them so as to see the temper. Next heat a piece of iron sufficiently hot and place the cutting tools on it. Draw the temper to either a dark straw yellow or a slightly brown yellow. If the coal used contains too much sulphur throw on some salt. I would also mention that a little salt used in the water is very good.

NOVEL FLOOR PLAN ARRANGEMENT

From Diamond Room, Red Wing, Minn.—I am sending the tracing of the plan of a first floor showing my idea of arranging the rooms of a house. The benefits to be derived from such an arrangement are large living room, with windows on three sides and the walls of the main living room not exposed to the outside. The latter is a matter of importance in this cold climate. I



NOVEL FLOOR PLAN ARRANGEMENT

should like to have some of the readers furnish an elevation for this plan. I do not care to have more than two rooms in the second story, the kitchen part being one story high. I do not want anything expensive, but on the contrary something plain and substantial of the colonial style.

"SWEATING" OF A CONCRETE COVERED FLOOR

From H. R. T., Peoria, Ill.—I am having some difficulty with a concrete floor, and come to the practical readers of the Correspondence Department of the paper for the purpose of seeking a solution of the trouble. The building is a two-flat structure, and the floors are of cement a half inch thick, laid on ordinary rough wood floors which have been deadened. These floors sweat a great deal, and the moisture at times collects in the low places.

It appears to me that the only thing left to do is to take up this cement floor and put hardwood floors in place of them, but it is possible some of the readers may have heard of similar cases and could suggest a remedy. Personally I cannot conceive of any one putting a flooring of this sort in a dwelling.

Note.—In regard to the above Ernest McCullough furnishes the following reply:

The house in question was examined at a time when the concrete floors were being taken off and oak flooring was being substituted. Thousands of houses have concrete floors and perhaps millions have bathrooms in which the floors are mosaic or tile laid on a thin layer of cement mortar or concrete. No trouble has been reported from them. The usual way in which this work is done is to nail a lath along each side of the floor joists near the top and on these strips rest short pieces cut to fit between the joists. The surface is then swabbed with hot tar or asphalt and on this is laid the cement coating. Floors thus built are always satisfactory.

The Peoria house had under the floors, joists as usual. On the joists was laid a rough flooring on which was placed 2 in. of excelsior in bags. On top of the excelsior was laid another rough board floor over which was placed a coating of cement mortar about ½ in. thick. It is not to be wondered at that the floors exhibited considerable dampness. Compressed excelsior as a collector of moisture is excelled only by a sponge. From experience I had once with excelsior supplied to me in thin bags to be used as an insulator in a small ice house I can certify that it seemed to absorb every ounce of loose moisture there was in the surrounding atmosphere before we got it into the wall.

In the Peoria house the excelsior was placed between two floorings of rough boards and no doubt was in place for some time before the cement plaster was applied to the top flooring. There may have been damp weather which supplied the excelsior and joints and rough boarding with plenty of moisture. We do not know but that it may have rained once, or several times, before the plaster coat was applied to form the cement floor. Then the concrete was applied and the wood and excelsior absorbed a fresh supply of moisture.

The moisture was stored up in the floor construction, the excelsior holding a very large amount. This moisture would have a tendency to vaporize when the house became warm through use and being closed up and heated. The vapor as it warmed would rise and coming in contact with the floor cooled by the cement coating on top would condense. The mortar being very dense possessed a high degree of capillarity and thus the moisture was drawn through to the surface where, added to the moisture condensed on top of the floor, from the air of the room, there was produced a condition of dampness very noticeable to all who entered the room.

The owner reported that on damp days he could wipe the floors with a cloth and wring the water from the cloth and that rugs on the floors were always damp. The only cause to be assigned for this is improper construction. We cannot possibly ignore the thousands of successful cement and concrete floors throughout the world.

OIL-MIXED CONCRETE

From O. M. R., West Haven, Conn.—I would like to ask "Contractor," whose letter appeared in the correspondence columns some time ago, what has been his experience in connection with the use of oil in cement and what kind of oil to use. How much of it should be used to a bag of cement? He had something to say in regard to the subject in the issue of THE BUILDING AGE for August, 1914, and I would like to learn briefly the results of the experiments which he was about to make at that time.

Note.—In connection with the above, our correspondent is likely to find much valuable information in the Bulletin issued last year by the Department of Agriculture and entitled "Oil-Mixed Portland Cement Concrete." The Bulletin, which is known as No. 230, points out that the admixture of certain mineral oils in small proportions not to exceed 10 per cent of the cement used does not lessen the tensile strength of the mortar; that the decrease in the compressive strength of mortar and concrete is not serious; that concrete mixed with oil takes much longer to set hard—perhaps twice as long—but that the increase in strength is nearly as rapid in the oil-mixed material as in the plain concrete. The use of oil does not make the concrete impervious to heavy water pressure but practically non-absorbent under low heads.

The value of oil-mixed concrete is particularly great in the construction of basement floors and walls, watering troughs, cisterns, barns, silos, and in all parts of concrete structures that are to be made damp-proof.

The oil should in no case exceed 10 per cent of the weight of cement and for the most part 5 per cent is all that is necessary. In other words, about 2½ quarts of oil should be added for each bag of cement used in the mixture. The oil should be fluid petroleum product and should contain no admixture of fatty or vegetable oils. It should show a flash point of not less than 150 degrees Centigrade by the closed-cup method.

The sand and cement should be first mixed with the proper amount of water into a stiff mortar to

which is added the correct amount of oil, and the whole mass again thoroughly mixed until all traces of oil have disappeared. Particular care should be taken to insure that the oil is thoroughly incorporated in the mixture and the time of mixing should be practically double that when the oil is not used. For this reason it is pointed out a continuous mixer should not be used in oil-cement-concrete work as it is difficult with this type of machine to increase the time of mixing sufficiently.

CONSTRUCTING AN ORDINARY SHED

From D. P. B., Redford, New York.—Referring to the problem of "W. M. L." on page 56 of the September issue, I would say that he can solve it in three ways. First with the steel square, taking the figures one and twenty-four and cutting each piece by those figures. Second, he can square out from each run holding the heel of the square at the angle as in Fig. 1. An angle will be produced by the two lines. Bisecting this the cuts are obtained. Third, he may obtain the cuts by using two graduated bevels. If these are not at hand he may use two bevels with tongues of equal length bringing the points exactly together as indicated in Fig. 2. If his bevels are of unequal length he should mark the length of the short one on the long one.

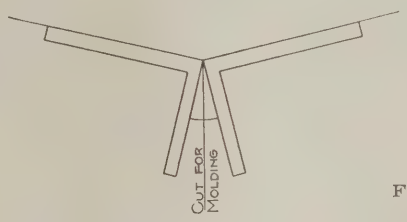


Fig. 1—Bisecting the Angle



Fig. 2—Obtaining the Cut for Bevels as Suggested by "D. P. B."

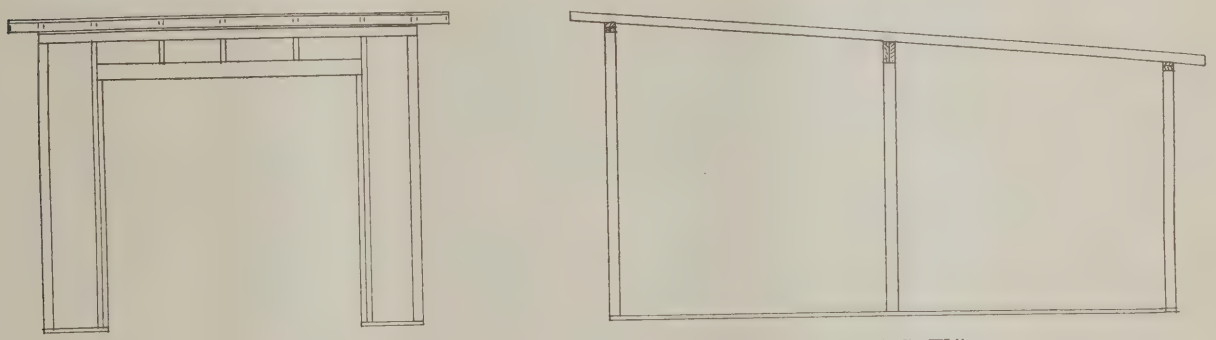


Fig. 3—Front and Side Elevations of Shed as Described by "W. S. W."

CONSTRUCTING AN ORDINARY SHED—SKETCHES OF DIFFERENT CORRESPONDENTS

From W. S. W., Hillsboro, Ohio.—In answer to the query of "W. M. L.," Orange, N. J., in the September issue of the paper, I am sending sketches with brief description which I hope will help him in constructing the shed for which he asks information. Fig. 3 shows a front and end elevation. I do not mean that it should be built exactly as I have shown it but I have aimed to bring out the main points so as to give him something which will serve as a guide in doing the work.

If the correspondent has a solid foundation he can use a 2 x 4 in. or 2 x 6 in. sill and 4 x 4 in. corner post. I would suggest using a double stud each side of the door running the outside ones through to the plate as shown in the elevation. I would use two 2 x 6's or 2 x 8's spiked together as a lintel allowing the ends to rest on the two inside studs. Then he can put a few short studs on top of this and a plate on top of them which will support the roof.

To my mind, 18 ft. is a pretty long span for a single rafter so I would suggest spiking two studs together or use a solid post in the center as shown in the side view and spike two 2 x 8's together and run them across the shed as shown, resting the ends on these posts. Now he can use a long rafter or he can splice them on this beam. I would make a butt joint with the outside rafters nailing a board on the inside at the joint and lap the others and spike them together. I would bevel the rest of the side studs on the top end so as to fit under the side rafters.

Let the sheathing project over the side and nail a board on the front and back end of the rafters, also run a board down the side, nailing it to the ends of the sheathing and to these boards. This stiffens up the ends of the sheathing and makes a finish for the edge of the roof.

The front of the shed is 1½ ft. higher than the back so take 1½ in. on the tongue and 18 in. on the blade of the square, and the tongue will give the plumb cut while the blade will give the seat cut. The tongue will also give the bevel for the top end of the studding on the side of the building to fit under the rafters.

The doors may be hinged or sliding according to preference. If sliding doors are used the track may project past the building and have a brace under it.

VARNISH FOR TOOLS

From M. R. N., Washington, D. C.—Please give me a receipt for varnish to keep bright tools and similar goods from tarnishing.

Answer.—A receipt given as a varnish for tools is as follows: Melt together 40 ounces of tallow

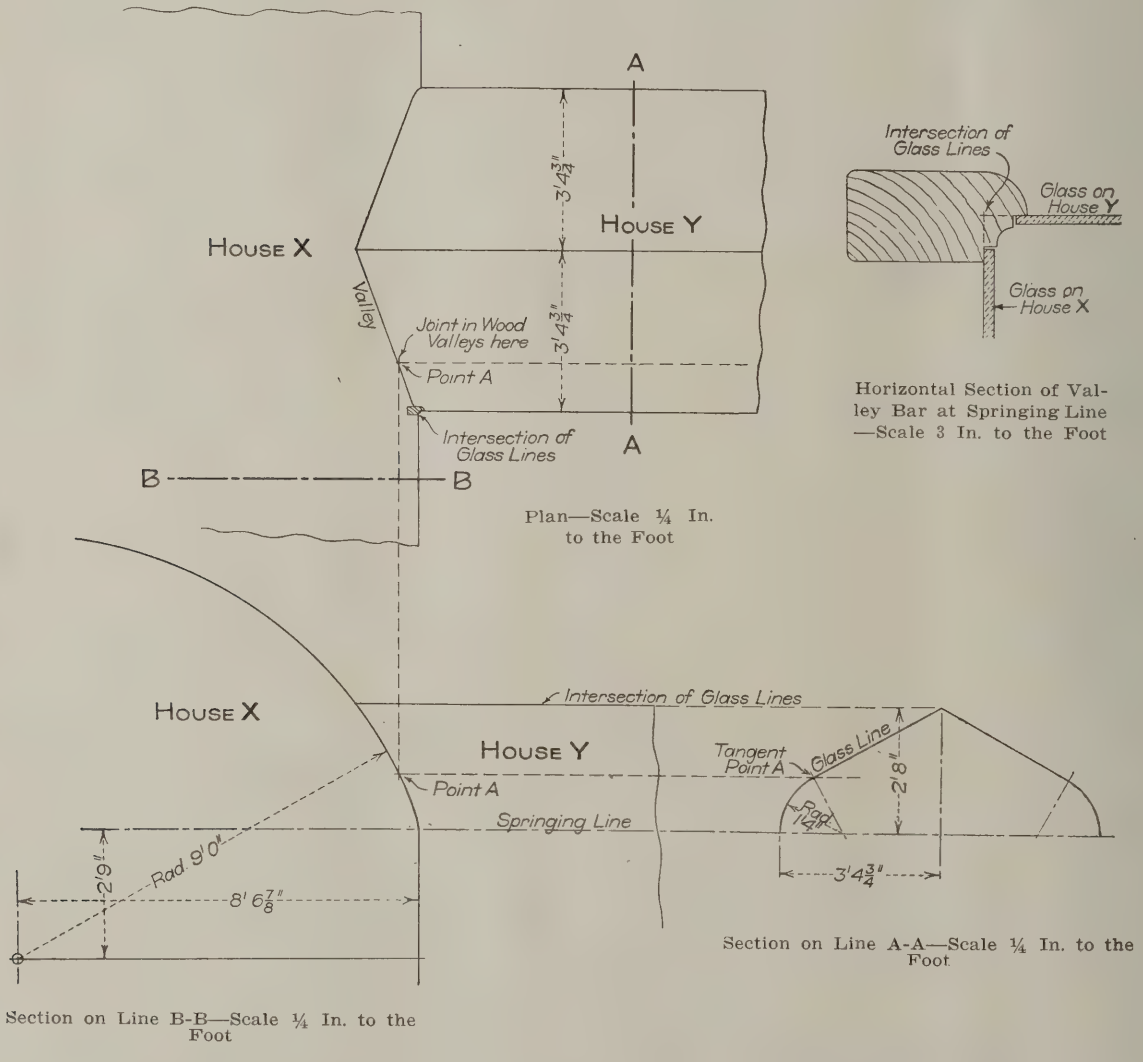
and 2 ounces of rosin and strain while hot; apply with a brush to tools and it will prevent them from rusting. Another receipt described as a varnish for polished metal is to pound bleached shellac in a mortar and then put it in a bottle of alcohol, agitating the alcohol frequently until it has dissolved as much shellac as it will; then pour off the clear liquid. The metal surface is first warmed and the varnish applied to it with a brush, giving a transparent coating that will protect the polished metal.

GETTING OUT CURVED VALLEYS FOR GREENHOUSE CONSTRUCTION

From C. G. P., Newark, N. J.—I am sending a tracing showing the two curved valleys for greenhouse construction, and would be greatly obliged if some of the practical readers will give me a good clear method for getting out shop drawings for this and similar two-curved valleys.

In this case the valley bar may be gotten out in two pieces, a splice being made at the tangent point of the 16-in. rod marked "A" on the drawing. The idea is to get the bars out of the smallest possible pieces of timber. The thickness of the valley bar is to be 1⅞ in. the entire length of the valley, but the height may vary slightly.

I take pleasure in stating that I am a subscriber to the BUILDING AGE, and have gained much practical knowledge from its various issues.



DETAILS OF CURVED VALLEYS FOR GREENHOUSE CONSTRUCTION

DIMENSIONS OF SMOKE CHAMBER IN A FIREPLACE

From E. B. A., Mount Vernon, N. Y.—I am going to build a fireplace in my house, but do not know how big I should make the smoke chamber. Is there any particular height to it above the smoke shelf? Is there any stated relation between the cubical content of the smoke chamber and the cubical content of the fireplace or between the area of the smoke chamber and the area of the fireplace opening the same as there is between the fireplace opening and the flue area? I would also like to know if the middle of the throat is directly over the middle of the fire chamber.

Note.—This letter offers excellent opportunity for a most interesting discussion of a subject which is constantly perplexing the builder owing to poor draft of chimneys, smoky fireplaces, etc.

EQUIPMENT FOR THE MODERN DAIRY BARN

SOME PERTINENT COMMENTS FROM A SANITARY POINT OF VIEW BY AN EXPERT

By W. L. Weintz*

It is only in recent years that the general public has given much thought or consideration to the vital question of sanitation in food supplies. Just why the American people have been so indifferent in the past does not concern us at this time, since the demand for clean and palatable food is now heard and respected in all communities. Much has been said and written on the subject of canned meats, etc., and none will dispute the satisfactory and beneficial results accomplished by such publicity.

According to recognized experts, however, there is no one food product largely assimilated by the human family which is so susceptible to contamination as cow's milk. The mere presence of slight foreign matter is sufficient to taint and contaminate the purest milk, and this fact makes it imperative that proper care and precaution be exercised by dairymen who are conscientious and honorable. In many localities it is no longer a question of an individual's conception of sanitation, since measures have been adopted by state legislatures regulating the production and sale of dairy products. There is no doubt in the mind of the writer that this movement will soon penetrate even the most obscure rural districts, for people are daily learning more concerning the need of sanitary measures, and their demands must be considered by the producer and dispenser.



FIG. 1—VIEW DOWN MAIN AISLE IN A BARN FITTED WITH MODERN EQUIPMENT

The logical place to begin operations in making an investigation of dairy products naturally is among the producers themselves, viz., the dairy cows. It need scarcely be pointed out that milk for human consumption must come from a healthy animal. The interest in breeding circles would indicate that this phase of the question is receiving proper consideration, and with the aid of modern knowledge on the treatment of disease among domestic animals there is no excuse for polluted milk being sold. It is therefore highly important that dairy herds be inspected at frequent intervals and the stock all kept in best possible condition.

In how many cases, though, is contaminated milk not primarily due to the animal, but to the conditions for which the owner himself is directly responsible. No matter what breeding or pedigree a dairy cow may have, if she is confined in a dark, poorly ventilated and filthy barn, her chances for producing certified milk are nil. With the invention and manufacturing of sanitary barn fixtures the public can no longer countenance disgusting barn conditions, and most dairymen have shown a marked interest in these modern appliances.

When barn equipment was first placed on the market it was caustically referred to as being adapted only for the rich man's barn, and therefore could never be of real economic value to the thousands of dairymen who depend on their herds for a livelihood. It is true that wealthy men who took up dairying as a recreation or hobby were first to realize the value of steel equipment for the dairy barn, both from a sanitary and practical viewpoint. Soon, however, the larger producers were constrained to investigate the manufacturer's claims regarding the advantages derived from an installation of this equipment, and gradually they came to see that their former views were unfounded and incorrect. At the present writing more and more dairymen are remodeling their barns and installing modern equipment, with the natural beneficial results to the community at large.

The value of steel barn fixtures is not confined to the sanitary conditions made possible by its use. It has been satisfactorily demonstrated that less labor is required to care for a given number of cows, that a marked saving in feed is noted, that cows are more comfortable and give a greater quantity of

*Illustrations courtesy of the J. E. Porter Co.

milk in those barns having modern equipment. So it will be seen that the consumer is not alone in deriving good from this up-to-date practice. It is merely a question of time until all dairymen will realize and acknowledge that the possibilities of their herds are exceedingly limited unless modern methods are pursued in their management.

Few people consider a dairy barn in the light of a manufacturing plant; yet that is precisely what it is, and incidentally a food product for universal consumption is manufactured there. It is only reasonable that we should expect to find the most approved machinery with efficient, skilled workmen performing their duties under comfortable conditions. In a modern dairy barn that is exactly what you will find, and furthermore, the owner will doubtless be a man of affairs and a recognized authority on his business. Dairying is no longer a haphazard side issue on the farm, and milk is now considered in many localities on a quality basis. Usually the degree of butter fat determines the market value, and the dairyman is at once concerned when for any reason his product fails to meet the standards established.

The accompanying illustrations will convey some idea of the equipment in a modern dairy barn. Note that provision is made for the cows to line up along the gutter, thus having all droppings in one place rather than on the stall platform. The gutter is somewhat deeper than the rest of the floor, and the animals may lie down in comfort without covering themselves with filth. All equipment is made of steel and the entire barn can be thoroughly scrubbed without damaging the fixtures. Swinging stanchions which are flexible at both top and bottom connections enable the cows to turn their heads in comfort, and relieve in a marked degree the forward thrust of the body when an animal gets up or lies down. Steel mangers or manger partitions make it possible to feed each cow according to her particular requirements—something very important in modern dairying. An abundance of light and fresh air penetrates all parts of the building, and the animals can thus be kept in excellent physical condition.



FIG. 3—ANOTHER INTERIOR SHOWING THE FEEDWAY WITH COWS IN THEIR STALLS

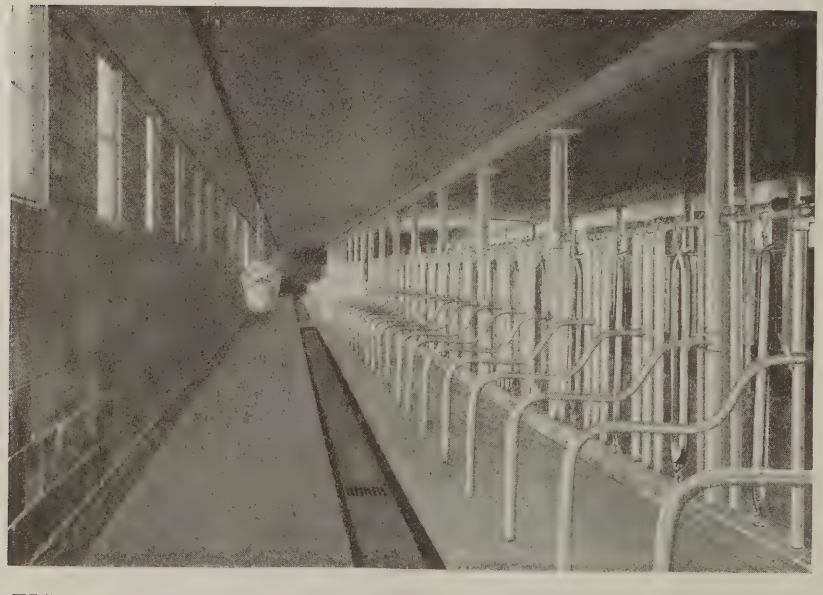


FIG. 2—INTERIOR OF DAIRY BARN IN SOUTH CAROLINA, SHOWING STANCHIONS, STALL SEPARATIONS, ETC.

The task of handling feed and litter is one which without modern equipment would entail excessive labor in a large barn. Easily operated and efficient carriers are therefore provided for this purpose and with their aid the work which formerly was irksome and disgusting becomes such that the owner himself has no hesitation in performing it. Litter carriers make it possible to keep the manure away from the barn and modern practice suggests one of two methods for handling litter. Either it is dumped from the carrier directly into the spreader and placed on the field, or the carrier conveys it to the manure pit, where it is treated somewhat and the fertilizer value augmented. Some legislative measures prohibit the sale of milk unless the litter is carried a certain distance away from the barn. In view of the movement under way for more stringent regulation of milk supply, it naturally behooves every dairyman to investigate his shortcomings and take steps to remedy them.

A ROUND REINFORCED CONCRETE BARN

"PROGRESS" PICTURES SHOWING CONSTRUCTION OF FIRST BARN OF THIS KIND ERECTED

WE take pleasure in presenting herewith illustrations and descriptive data relating to what is said to be the first round reinforced concrete barn ever constructed in this country. The building contractor executing the work states that this claim is based upon information from various authentic sources, including among others the Agricultural Experiment Station of the University of Illinois, and we are indebted to him for the particulars and "progress" pictures here presented.

Reinforced concrete was selected for its permanence and the round shape for the convenience of stable arrangement, large unobstructed loft for hay storage and the relatively small amount of material required to do the work. The concrete used was a 1:2:2½ mixture, the proportions named being due to the fact that local gravel was utilized. The reinforcing material was ⅜ in. square twisted steel spaced 12 in. on centers both horizontally and vertically and held in place partly by "Universal chairs" and partly with "Bates" ties.



GENERAL VIEW OF THE COMPLETED BARN

Wood forms were used on the job, there being two complete sets inside and outside, each 3 ft. high and in sections about 8 ft. long. The builder states that considerable care was used in making the forms, as he depended upon them for the plumb lines of the wall. The rails on the forms were horizontal; three to a section, about 1 x 5 in. in size, and fastened together by splice pieces and half-inch bolts for the inside forms. This arrangement proved sufficient for the purpose. The outside forms had to be strengthened by the use of half-inch wire cable hoops tightened up with draw-lugs, and for this work tank hoop fittings were utilized.

In making the forms it was found that the rails would spring out of shape when sawed, and difficulty was experienced in sawing them accurately. A band saw was first tried, but it was found that an ordinary circular saw worked better as the curvature was not great. In order to bring them to the exact shape the contractor used a template tacked to them and jointed them on an upright moulder, allowing the template to run on a collar on the spindle.

Clay of about the consistency of ordinary putty was used for filling cracks, etc., in the form work. A very cheap fuel oil worked well on the forms—not so much to keep the concrete from sticking as to check the shrinking and swelling of the lumber.

The builder states that 100 cu. yd. of concrete in a round building like the one here described provides equal stable room and a much larger loft space than 200 cu. yd. in a rectangular building.

For the purpose of making the roof a self-supporting dome and at the same time reduce the concrete in the walls to the lowest practical point use was made of two tension members sufficiently rigid to maintain their circular shape. The reinforced concrete cornice and plate at the top of the concrete wall was made 10 in. deep and 18 in. broad in which, in addition to all vertical wall reinforcing being bent out through it, there were placed five ⅜-in. square twisted horizontal reinforcing bars. A detail of the main cornice with the position of the reinforcing bars clearly indicated is presented herewith.

This member maintains the circular shape of the walls, which above the loft floor are only 6 in. thick, and receives the thrust to the first set of rafters, which are 2 x 6 in. by 28 ft. in length, placed about 25 in. on centers and running at an angle of 30 deg. from the vertical to the hip in the roof, where they are about 15 in. on centers.

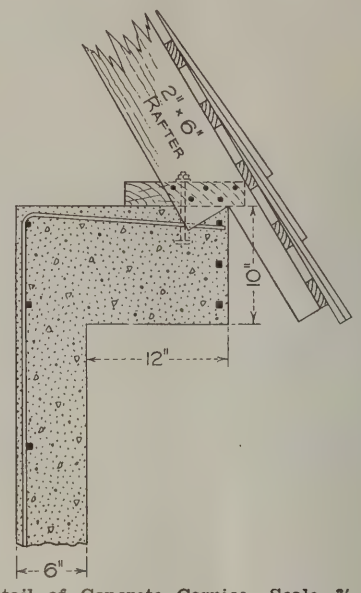
At the hip and securely spiked to the lower rafters, which are cut off square, is the second tension member in the form of a 7 x 9-in. wooden plate made up of six layers of selected oak plank fastened together with about 150 lb. of nails and spikes. The layers of this plate being sprung down to fit the square cut on the ends of the lower rafters do not form a plane but are 30 deg. lower on the inside than on the out, thus making this plate saucer-

shape and providing a direct bearing for the thrust of the upper rafters which are 2 x 6 in. in cross section 27 ft. long and run to a point at the center of the building at an agle of 30 deg. with the horizontal. As these two plates and sets of rafters constitute the entire roof framing, the practical builder will readily see that a very light construction was produced.

In the lower section of the roof, it was found that merely lathing it made it quite rigid, but to assure strength independent of the lath, solid 2 x 6-in. bridging was cut in between the rafters all the way around the building about 9 ft. apart, thus preventing sagging of the rafters.

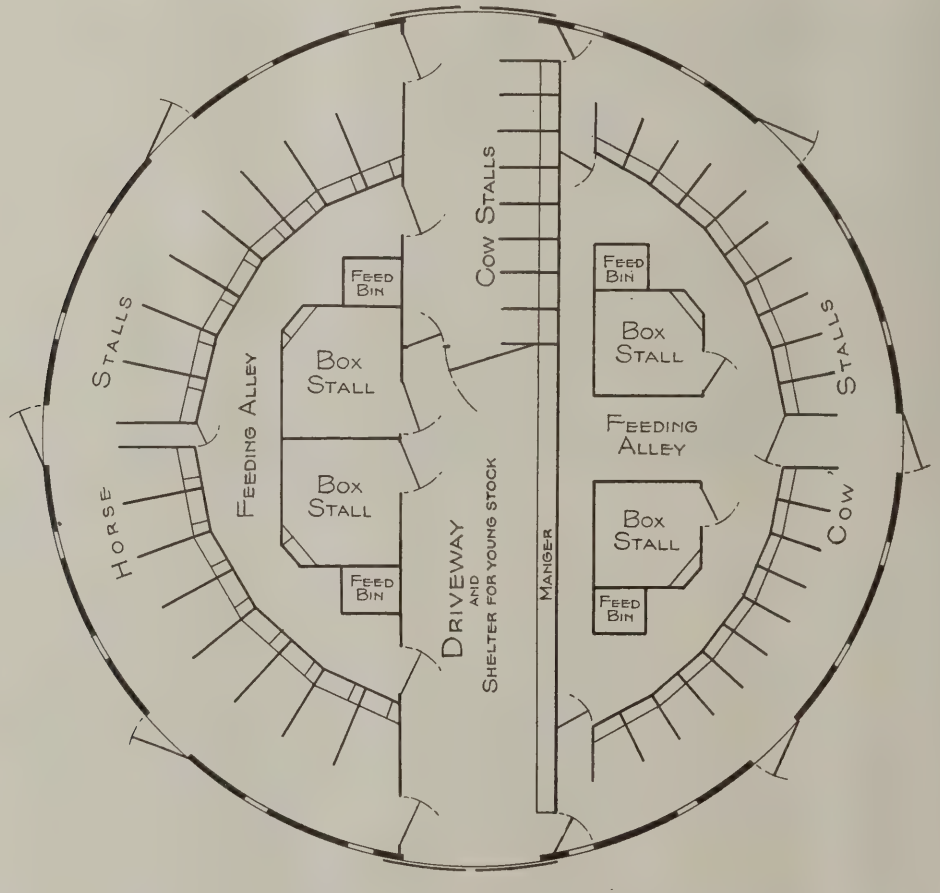
In the section of roof above the hip, which is about 47 ft. diameter, 18 rafters 2 x 6 in. and 27 ft. in length were run to the center of the building. These, when erected, showed considerable sag, but a set of headers was cut in between them about 6 ft. from the center to which to fasten an intermediate set of rafters. By cutting these headers of good length and forcing them in it was possible to force the sag out of the main rafters. The same process was pursued with another set of headers lower down the roof which received a still shorter set of rafters and also with a circle of solid 2 x 6-in. bridging still lower down, with the result that a building, no vibration could be detected in the roof.

The dome of the building is covered with 6 x 20-in. white cedar shingles laid 6 in. to the weather.



Detail of Concrete Cornice—Scale ¾ In. to the Foot

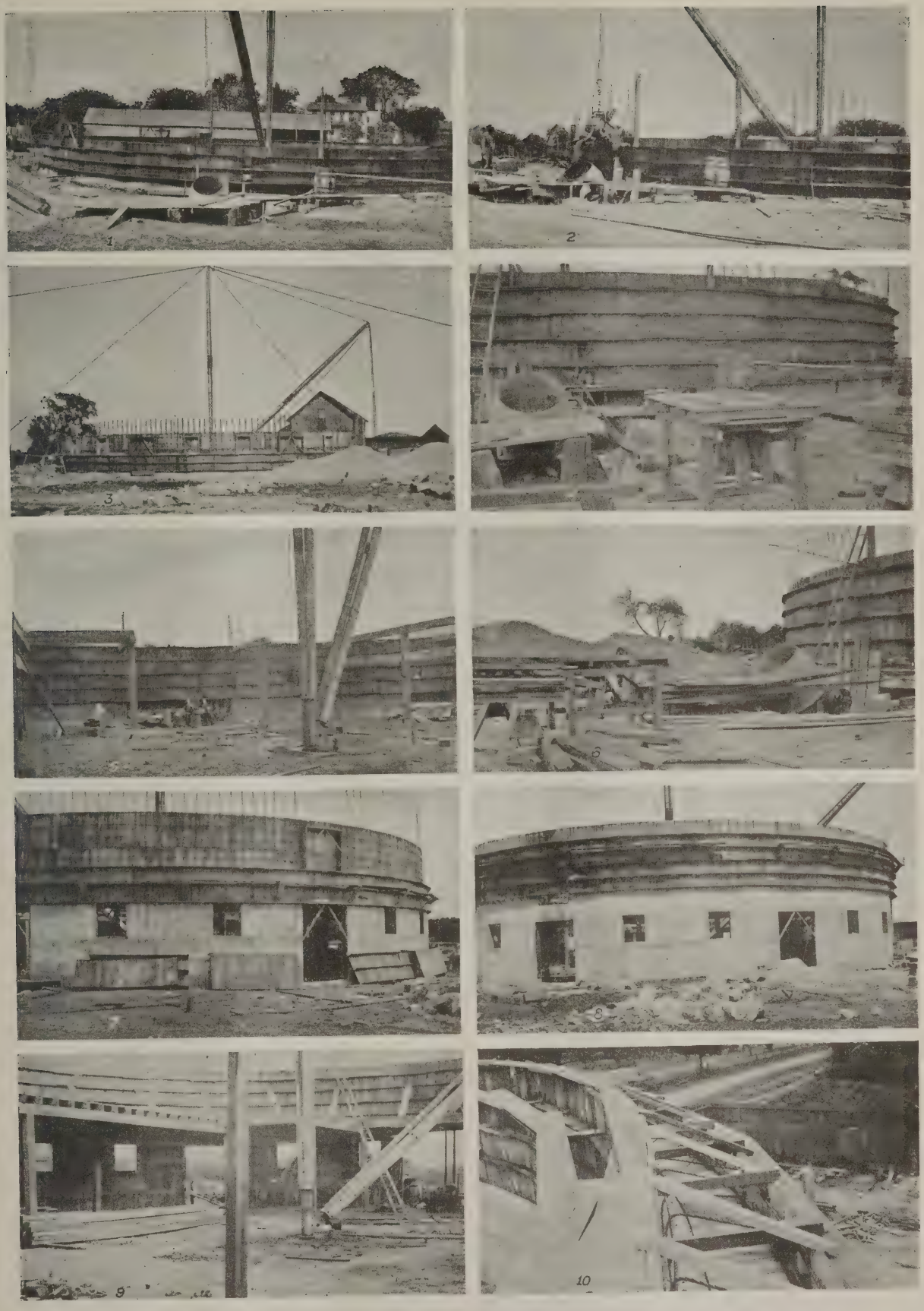
Among the equipment used in doing the work was a small concrete mixer, a 5-hp. Fairbanks "Bull-dog" gasoline engine and a home-made saw rig, the interesting feature of which was the mandrel. This had a 4-in. space between collars, allowing the use of emery wheels, shaper bits or jointer head.



Floor Plan of Round Reinforced Concrete Barn—Scale 1/16 In. to the Foot

stiff construction was produced with about a 2½ in. crown in the rafters.

The builder says that during a gale of wind that capsized two sail boats on Delaware Bay near the



"PROGRESS" PICTURES SHOWING DIFFERENT STAGES OF THE CONSTRUCTION WORK ON THE ROUND REINFORCED CONCRETE BARN

It was turned out on the other end for a No. 3 Morse twist drill sleeve of standard taper. These drills, with a little special grinding, were found quite satisfactory for boring wood when running 1600 revolutions per minute, which was the speed of the saw mandrel. The derrick was also home-made and fitted with ball bearing turntable from a local machine shop.

Referring to the "progress" pictures, No. 1 shows the inside forms 1 ft. below grade and 5 ft. above, with two sections in place. The outside forms showing a foot of concrete wall, are 4 ft. high above grade. The door frames are in place.

No. 2 represents the process of pouring concrete, the bucket having a capacity of 7 cu. ft. Some of the reinforcing material is in place and the wire cable hooping of the forms may also be seen.

No. 3 shows the inside forms 8 ft. high and the stable door and window frames in place. The derrick has a 52-ft. mast and a 50-ft. boom on ball bearings. The gravel pile is seen at the right.

No. 4 shows the complete equipment of outside forms in place. The concrete mixer and circular saw rig are in the foreground. The saw rig is driven by an engine inside of the forms which also does the hoisting.

No. 5 shows girders and joists being placed extending through the forms into the wall. The hoisting engine is also visible which runs the concrete mixer and the saw.

No. 6 clearly indicates the convenient location of the equipment, there being no shoveling required except into barrows which dump into the concrete mixer, the latter into the bucket and this in turn into the forms.

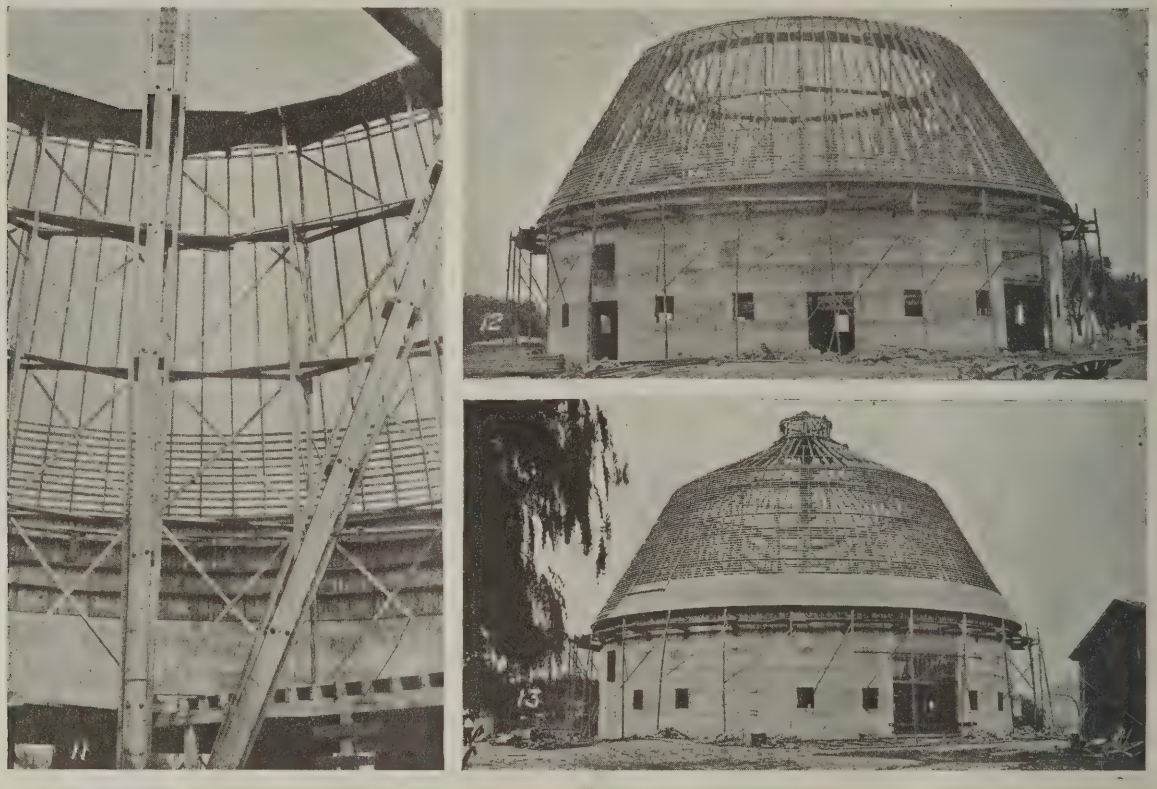
No. 7 represents the first story completed, also the reinforcing scaffolding and section of forms ready to be raised.

No. 8 shows the forms and reinforcing in place with everything ready to "pour" the concrete.

No. 9 is an interior view with the loft floor in place around the wall.

No. 10 shows the form box for the concrete cornice with reinforcing rods in position.

No. 11 represents the scaffolding for the roof placed on the loft floor and 32 ft. high. The first set of rafters are shown in place.



"PROGRESS" PICTURES OF THE FIRST ROUND REINFORCED CONCRETE BARN ERECTED IN THIS COUNTRY

No. 12 shows the lathing for the roof.

No. 13 shows the roof partially completed, there being required to cover the entire dome 30,200 shingles.

The concrete barn here shown was erected for H. McDaniel on his farm, "Cherbourg," near Dover, Del. It has a capacity for 18 horses, 30 milch cows, 20 head of young stock, 200 tons of hay and 200 bu. of grain.

It is 72 ft. in diameter and 61 ft. in height. The concrete walls are 20 ft. high, the stable walls 8 in. thick and the loft 6 in.

The barn was designed and the erection supervised by W. M. Newton, a contractor making a specialty of concrete work, Dover, Del.

MAKING HAND-RIVED CYPRESS SHINGLES

SOME INTERESTING PARTICULARS REGARDING THIS IMPORTANT SOUTHERN INDUSTRY

THE attention which builders are giving to old-fashioned rived or split shingles renders the story of their making one of more than passing interest. Many of the shingles produced are the work of negroes working independently, but perhaps most of the best shingles are the work of men laboring under the supervision of a large concern which sees that a standard is established and to which it is adhered.

The process described in the following lines is that followed by negroes working in the Black River Swamp, which is near the southern boundary line of South Carolina, the finished product emerging as that of the Hammer Lumber Co., Philadelphia, Pa. The



Fig. 1—Buck-sawing a Cypress Tree into Lengths for Making Shingle Bolts

various steps are often somewhat amusing, being evolved from the fertile imagination of the negro workers.

First, the proper thing to do is to pick out a good specimen of swamp cypress, and this is then subjected to various tests. The bark is examined, and if it is straight up and down the tree will split right. If it is "twisted from east to west" it should split, but if the twist is from west to east it will not. Next, a chip is taken from the hardest part of the tree which, in a leaning tree, is on the under side and in a straight tree is on the sunset or west side. Finally a piece is chewed and if it chews all right the worker is satisfied that the tree will split good and draw smooth under the draw-knife; hence is "meat" for shingles.

In the tree felling operation and in the subsequent cartage of shingles, the reader should keep in mind that the process is conducted in a swamp and that various precautions are taken because of this fact. First, several small trees are felled and placed so as to form a "cradle" or bed



Fig. 2—Splitting the Bolts in Slabs



Fig. 3—Using the Draw Knife in Shaving the Shingles to Size

PICTURES SHOWING SOME OF THE VARIOUS OPERATIONS

upon which the cypress tree is to fall. This cradle prevents the tree from being spoiled in its fall and also keeps it from sinking in the marshy swamp soil. A scaffold is then built around the base of the tree for the workers to stand on while felling it.

After the tree is felled it is buck-sawed into lengths which will allow of full-length 24-in. shingles, the buck-sawing operation being shown in Fig. 1. These lengths are then cut into bolts 7⅜ in. wide. The bolts are then rived or split into slabs 1 in. thick by a wedge-shaped knife set at right angles to its handle and worked with a wooden mallet, as shown in Fig. 2.

Finally the slabs are placed in the draw-bench or "break," and worked with a draw-knife, being shaved down to a ⅝-in. butt, and the usual shingle taper. As shown in Fig. 3, the draw-bench holds the slab tightly by means of a treadle. The slab extends over the end of the draw-bench toward the worker, much in the manner of a springboard. This springboard effect aids the worker to secure the proper taper.

The shingle now measures 7 x 24 in., and has a ⅝-in. butt. It is stacked up with others to make piles of 500, or a square "pen," and is then inspected. The entire process is carried on within a few feet of where the tree stood, each worker producing about 1000 shingles per week. Lastly, bundles of twenty-five are made and fastened with wire and the finished product is carried on the shoulders of negros to high ground, the road traveled being rough and perilous, as in many places the path is formed of single tree trunks.

Once on high ground, the shingles are allowed to dry for from sixty to ninety days, and are then carried on to the railroad siding for further inspection and stenciling. They are then shipped as the "Hammer Brand." As indicated by the foregoing description, the process is entirely by hand, and interesting because of its primitiveness in these days of machinery and high-speed output.

A BOOK ON LIGHTNING RODS

Contractors and builders who are interested in the use and value of lightning rods will be glad to learn that the subject is covered in a very thorough manner by O. S. Peters, assistant physicist of the Bureau of Standards. The work is valuable from a statistical standpoint, and traces the early history of the lightning rod to the present status of the practice of protection against lightning.

There are twelve chapters, covering 127 pages, in which there are numerous tables and photographs. Attention has been given to materials and construction of lightning rods, earth connections, arrangement of rods and other important matters, while the question of cost is also considered. It is shown that the liability of barns to fire from lightning, as compared with their liability to fires from other causes, far exceeds that of houses. It is said that in the cases of 200 barns struck by lightning 87.5 per cent were fired, while of 325 houses 23 per cent were fired. It thus appears that, when struck, barns are practically four times as liable to take fire as houses.

The book is identified as No. 56, Protection of Life and Property Against Lightning, Technologic Papers of the Bureau of Standards, and may be procured from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 35c. a copy.

MODIFICATION OF NEW ZONING LAW

The Board of Standards and Appeals of New York City adopted on Oct. 4 a resolution extending until July, 1917, the time in which builders, who through an oversight neglected to comply with the new zoning laws, will be allowed to erect their structures without being subject to a penalty. The board decided to allow this modification because it believed that many builders had not had time to familiarize themselves with the provisions of the changes provided under the new zoning laws.

PATCHING CONCRETE FLOORS

One of the principal objections often raised against the use of concrete finished floors is the difficulty and cost of successfully repairing places that become worn or damaged. For best results it is usually considered necessary to cut down the worn place at least 1½ in. into the unbroken concrete, under-cut the edges, clean out the dust and loose particles thoroughly, wash with a thin cement grout, fill in with a paste grout and finally float to a level surface a mortar of cement and crushed stone or gravel. The patch must then be kept moist at least a week or ten days, keeping all traffic off in the mean time.

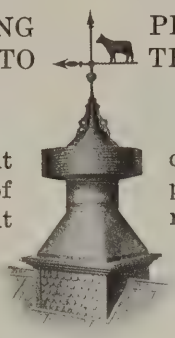
W. P. Anderson, president of The Ferro Concrete Construction Company, states that his company often uses a method of patching concrete floors which is much cheaper and requires far less time than the method commonly used. Mr. Anderson's method requires the use of mastic material made from a mixture of asbestos fiber and rubber gum. This mixture is applied with a trowel after thoroughly cleaning the damaged surface. Very little cutting of the old concrete is necessary, other than to break off loose particles. The gum can be worked to a feather edge so that it will readily join with the undamaged concrete surface and eliminate the under-cutting required with the old style of patch.

A patch of this sort can be opened to foot traffic within a few hours, and to heavy traffic within a day or so. It is thus possible to repair a much-used portion of a mill or factory floor almost overnight. The cost varies with the size of patch, but will range from 16 to 18 cents per square foot.

It is estimated by the Forest Service of the United States Department of Agriculture that there is enough waste from the sawmills of the South alone to produce 20,000 tons of paper a day.

USE OF SHEET METAL ON FARM BUILDINGS

ITS FIRE AND LIGHTNING PROOF QUALITIES ARE FEATURES OF VALUE TO THE PRACTICAL BUILDER



WE have been hearing a great deal about preparedness since the outbreak of the European war, and it is evident that the nation that does not prepare itself against the attacks of its enemies will soon be overwhelmed. The same is true of farm buildings, for they have numerous enemies, and, unless they are prepared to withstand the onslaughts of fire, lightning, and other destructive elements, are more than liable to succumb sooner or later. Many farmers with large and well equipped barns, housing valuable registered and pedigreed stock, overlook the fact that they are not fully protected from loss by fire, even though they have their property insured for its entire valuation.

Statistics show that numerous opportunities await the enterprising contractor to do a larger business in metal roofing, siding, cupolas, etc., for use in connection with farm buildings. The field is not confined to new structures, for there are thousands of farm buildings that could be made more serviceable and the property more valuable if the roofs and walls were covered with sheet metal. All-metal structures have been accorded a popular reception in the country, and the work is profitable to the builder and is especially desirable in the dull season.

There are many features in connection with sheet metal work that commend themselves to the discriminating builder. Steel roofs and walls are permanent and command lower insurance rates. They have durability and long life, which, combined with the ease of application and minimum cost of maintenance, render them adaptable for use on farm structures. Buildings covered with sheet metal can be made attractive and will present an effectual resistance against the continuously active attack from the elements. It is claimed that a structure completely covered with sheet metal and properly grounded is lightning-proof and more dependable than a building simply equipped with rods. A good sheet metal roof is capable of withstanding the attacks of its most destructive elements—rain and moisture; and it will resist high winds where sheets are carefully selected with a view toward the great strength and rigidity needed. This is especially true of corrugated sheets, which are practically self supporting, and will make a building very substantial even when the framework is light. The use of corrugated sheets permits of light construction, and the sheets properly laid will not check or crack at the seams.



A MODERN FARM BARN WITH STEEL ROOF AND SIDING

Sheet metal roofing and siding can be applied to any farm building at a comparatively low initial cost, but the character of the building should be considered to determine the kind of material best suited for its purpose. There are several types of roofing and siding, notably, pressed standing seam roofing,

V-crimped roofing, roll and cap roofing, corrugated roofing and siding, weatherboard siding and steel pressed brick siding. Generally speaking, where the roof pitch is less than 3 in. to the foot, roll and cap or pressed standing seam roofing is best, while



SHOWING USE OF SHEET METAL ON A POULTRY HOUSE

a pitch in excess of this may be covered satisfactorily with corrugated or V-crimped roofing. Beaded ceiling or siding may be easily applied directly over level joints, to rough sheathing or over plaster. In weatherboard siding the contractor is offered a fireproof substitute for wooden weatherboards, and its attractive appearance makes it quite suitable for any structure where looks is a factor. It can be applied without any trouble where sufficient care is taken to keep the lines horizontal. Weatherboard siding may be nailed directly to the studding placed 16 in. on centers, or to sheathing boards. Steel corner boards are recommended to give a neat and finished appearance at the corners.

A pressed standing seam roofing is a serviceable type and gives an attractive appearance to any building on which it is applied. A ridge roll or ridge capping is not essential in this style of roofing, but can be used as a trimming, if desired.

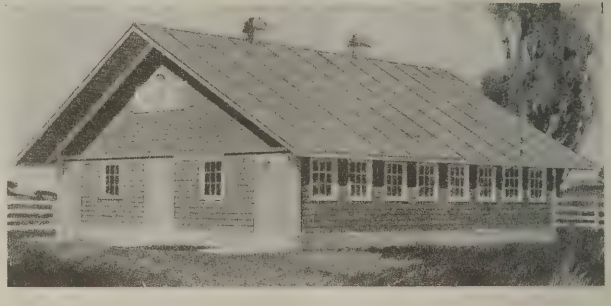
Roll and cap roofing is used on roofs having only a slight pitch, or a fall of less than 2 in. to the foot. An explanation for this is found in the fact that roll and cap roofing comes in rolls of 50 lineal feet and the cross-seams which occur every 10 ft. are perfectly formed by machinery. When the flanges are bent up, the cross-seams extend to the top of these flanges on either side, insuring an absolutely leak-proof surface. The tools required to lay roll and cap roofing are a punch, cap squeezers and a pair of roofing tongs for turning up the flanges for side seams. Roll and cap roofing is best applied to sheathing which entirely covers the rafters. Self-capping and roll roofing offers the same advantages for nearly flat roofs as roll and cap roofing.

In applying corrugated roofing to wooden framework, it is considered good practice to ascertain first from which direction the heavy winds blow and begin laying the roofing at the opposite end of the roof, laying the first sheet at the lower corner. A very strong roof, absolutely free from leakage, may be obtained by applying 3 in., 2½ in. or 2 in. corrugated sheets 27½ in. wide, lapped 1½ corrugations to each lap. This gives a covering surface of 24 in. to a sheet. While the roofing is being put on it is advisable to paint between the laps, as this aids in making the roof watertight. A prominent manufacturer says that it is best to apply light gauge corrugated roofing, say 26 gauge, to close sheathing or common stock boards and not directly to the rafters. With heavier gauge material sheathing will be found unnecessary, the corrugated sheets being applied directly to purlins. For this work 1 x 4 in. stuff, about 8 in. apart, will be found serviceable. If the underside of the roof will be subjected to hot air, steam or sulphurous fumes, a felt lining should be used between the sheathing and the roofing.

A lead washer should be used with every nail that is put into sheet steel roofing or siding. The washer makes a watertight joint under the nail head and prevents all leakage and rusting at that point.

For siding on wooden framing, heavy gauge corrugated material is regarded with most favor, as these sheets can be nailed direct to the studding. The elimination of sheathing effects a saving in the lumber bill and the construction work is facilitated. Siding should be started at the bottom, always using a baseboard, which will keep the sheets from contact with the soil and its corroding elements, and a long life, free from rust, is made possible for the bottom row of sheets as well as for other portions of the structure. In any building where there is likely to be pressure from the inside, it is advisable to use enough sheathing boards to prevent this strain from bearing on the metal sheets. Such sheathing will be found necessary in a barn where the hay pressure is unusually great. Close sheathing or felt lining should be employed where sheet metal siding is used on stables, as fumes from manure pits are harmful to all metals. The same precautions should be observed with sheet metal roofs on stables.

V-crimped roofing is very easily applied and does not require the use of cleats or any other fastenings, except nails. This roofing may be laid directly over any old shingle roof, on sheathing boards



A COW STABLE WITH SIDES AND ROOF OF SHEET METAL

placed about 2 ft. apart, or on rafters set 2 ft. on centers. These sheets are applied with V shaped wood strips, 50 lineal feet being required for each square of roofing. One hundred lineal feet of sticks are required for a square of 3 V-crimped roofing, while 4, 5 and 6 V-crimped require no V sticks, as the sheets have enough rigidity without them. The wooden V sticks give so much rigidity that V-crimped sheets may be applied directly to rafters.

If applied in this way, with the upper ends lapped over the lower, it will be found necessary to provide crosspieces nailed between the rafters to give a nailing support for lapped ends where they come.

Experts consider it much better practice, however, not to lap the ends of the V-crimped sheets but to lock them together as is done in standing seam roofing. This is true whether the sheets are applied to the rafters or over sheating boards. The use of sheathing boards is to be preferred for V-crimped sheets, as this construction insures a stronger and more durable roof. It is not recommended that such sheets be used where the roof pitch is less than 2 in. to the foot. If V-crimped sheets are put on over old shingles 3 in. nails which will go through the shingles to the sheathing are best for the purpose.



A CORRUGATED IRON POWER HOUSE AND ITS RELATIVE POSITION TO THE BARN

The "ground" connections may be made by using metallic rods that are fastened securely to the metal covering and extended at the other end well into the earth. The earth is the great reservoir of electrical energy and it is always at zero potential. If a discharge of lightning can be directed into the moist earth by a conductor, its energy is soon dissipated, but the "ground" connection should extend well into the moist earth. A piece of galvanized iron pipe, driven into the ground seven or eight feet, makes a good "ground." Large buildings should have two or more "grounds."

The U. S. weather bureau, in a Bulletin on Lightning and Lightning Protection, recommends a No. 3 galvanized wire as sufficient in size for lightning protection. If metallic downspouts are used as conductors, the connections should be made with the "grounds" with riveted joints. Copper conductors give no better protection than iron if the iron is galvanized to prevent it from rusting.

All painted metal roofing and siding should be painted as soon as put on in order to cover up any metal that may have been exposed through scratches. High grade paints will be found economical in the long run, both from the standpoint of durability and the frequency of repainting.

Galvanized roofing and siding should be exposed to the atmosphere for about eight weeks before they are painted. This gives the slightly greasy surface of the galvanizing an opportunity to weather away, and a stronger foothold for the paint is thus secured on the surface of the zinc. It is unnecessary to paint galvanized material in clean, dry atmosphere, such as is encountered in the South, Southwest and Northwest.

The accompanying illustrations show a number of farm buildings on which sheet metal has been successfully and economically used and are presented through the courtesy of the Milwaukee Corrugating Co., Milwaukee, Wis., and the Inland Steel Co., Chicago, Ill. The latter company has for some time past been preparing an excellent book on the value of sheet metal on farm buildings, and its publication has only been delayed by the condition of the galvanized sheet market.



A GOOD EXAMPLE OF THE USE OF SHEET METAL IN FARM BUILDINGS CONSTRUCTION

MEANING OF "FIREPROOF CONSTRUCTION"

Much discussion has occurred in the past as to what constitutes real "fireproof construction," and in order to give a clear definition of what is meant in the law by this term when reference is made to factory buildings, the Labor Law of New York was amended by the last Legislature. The section relating to this matter now reads as follows:

1. *Fireproof construction.*—A building shall be deemed to be of fireproof construction if it conforms to

the following requirements: All walls constructed of brick, stone, concrete, or terra cotta; all floors and roofs of brick, terra cotta or reinforced concrete placed between steel or reinforced concrete beams and girders; all the steel entering into the structural parts encased in at least 2 in. of fireproof material, excepting the wall columns, which must be encased in at least 8 in. of masonry on the outside and 4 in. on the inside; all stair wells, elevator wells, public hallways and corridors inclosed by fireproof partitions; all doors, fireproof; all stairways, landings, hallways and other floor surfaces of incombustible material; no woodwork or other combustible material used in any partition, furring, ceiling or floor; and all window frames, doors and sash, trim and other interior finish of incombustible material; all windows shall be fireproof windows except that in buildings under 70 ft. in height fireproof windows are required only when within 30 ft. of another building or opening on a court or space less than 30 ft. wide, and except further that any window not within 30 ft. in a direct line of another building not in the same vertical plane, nor opening on a court or space less than 30 ft. wide, nor within 50 ft. in a vertical direction above the roof of a building within 30 ft., may be provided with plate glass not less than one-fourth of an inch in thickness, no light of which shall exceed 720 sq. in. in area; except that in buildings under 150 ft. in height there may be wooden sleepers and floor finish and wooden trim, and except that in buildings under 150 ft. in height heretofore constructed there may be wooden sleepers, floor finish and trim and the windows need not be fireproof windows, excepting when such windows are within 30 ft. of another building.

STRENGTH OF TREATED TIMBER

The result of some recent tests carried on by the Forest Service in order to determine if timber is weakened by preservative treatment is announced in Bulletin 286. The timbers tested were Southern yellow pine and Douglas fir, beams of large size being employed. Some of the results are stated to be as follows:

Timber may be very materially weakened by preservative processes.

Creosote in itself does not appear to weaken timber.

A preservative process which will seriously injure one timber may have little effect, or no effect, on the strength of another.

A comparison of the effect of a preservative process on the strength of different species should not be made unless it is the common or best adapted process for all the species compared.

The same treatment given to a timber of a particular species may have a different effect upon different pieces of that species, depending upon the form of the timber used, its size, and its condition at the time of treatment.

EMERGENCY MUD HOUSES FOR ENGLAND

The possibility of using mud as a building material and so solving the urgent problem of providing cheap country cottages in the rural districts of England and housing accommodation in the areas where there has been a sudden influx of war workers is being made the subject of an interesting experiment by the new household and social science department of King's College for Women, University of London, says a late issue of the New York *Sun*.

Six mysterious looking walls have just been erected in the grounds at Camden Hill, each wall being composed of a different mixture of mud, with a view to testing which proves most suitable to the English climate.

In each case the earth has been subjected to a different process of preparation. In one case waterglass has been added, in another soft soap and in another case lime has been added to the earth and soft soap. A "grouting" of cement has been poured over the mud in yet another case and there is one wall made of earth alone.

A MODERN CORN CRIB AND GRANARY

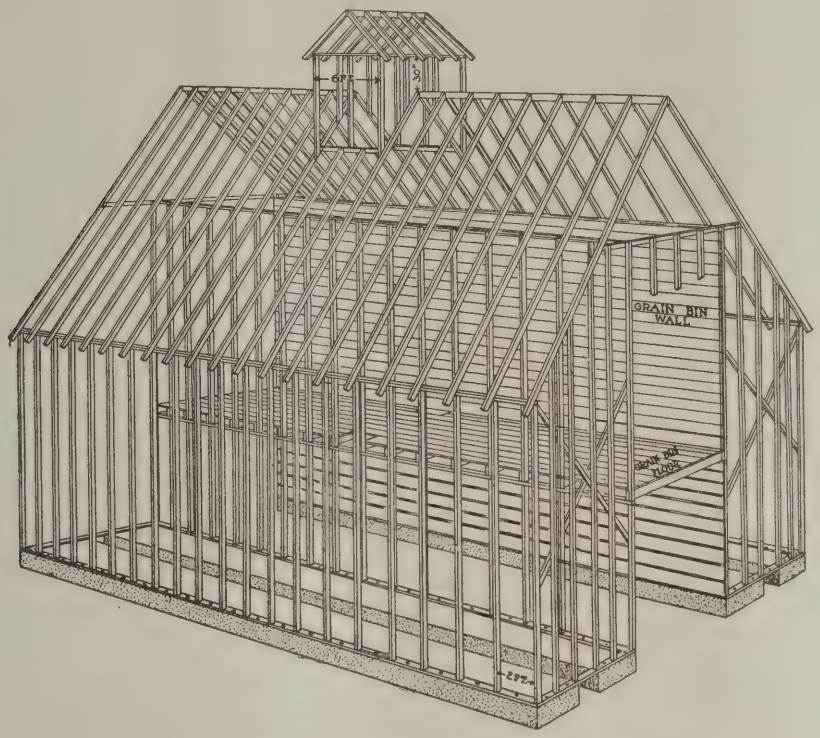
AN IMPORTANT ADJUNCT OF THE WELL-EQUIPPED FARM—THE CORN ELEVATOR

ONE of the more important buildings upon the well equipped farm located in corn growing sections is the crib and granary. As this structure is subjected to great internal pressure, a strong framework is essential, particularly in connection with the storage bins, if ultimate economy is to be secured. The building should be so constructed that it will keep the grain from spoiling and serve as a protection from mice and rats. Obviously the first essential of a good building for storing grain is a vermin proof floor upon a solid foundation. Another essential is that the spot on which the building is located be well drained. Concrete serves as an excellent material for the foundation and floor, not only by reason of its durability but the cost for repairs is little or nothing. It is sanitary, vermin proof and easily constructed.

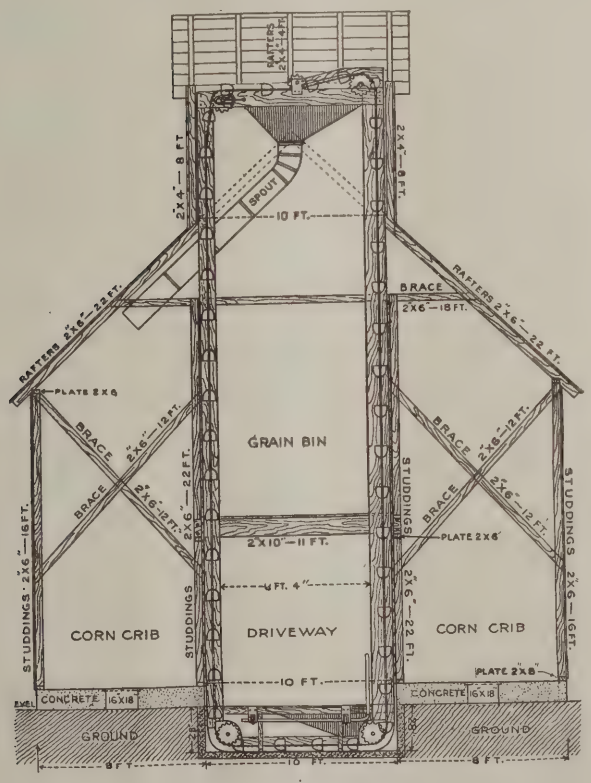
One of the illustrations presented herewith affords an excellent idea of the framework for a building of this kind measuring 26 x 40 ft. Carpenters and builders have well defined ideas of their own as to the framing and construction of corn cribs, but if they prefer a more substantial bracing than that indicated, they can add a 2 x 10 in. brace running crosswise on the crib, which can be bolted or nailed to the cross braces shown in the drawings. These can be used every 4 ft. or for every other studding. The floor plan shows the general layout with the concrete driveway extending into the crib as far as the pit into which the corn

is dumped before being transferred to the bins on either side.

The foundation is made of concrete mixed in the proportion of one part cement to six parts gravel.



Perspective of Framing for a Corn Crib 26 x 40 Ft. in Plan



Vertical Cross Section of Corn Crib, Showing Elevator Installation

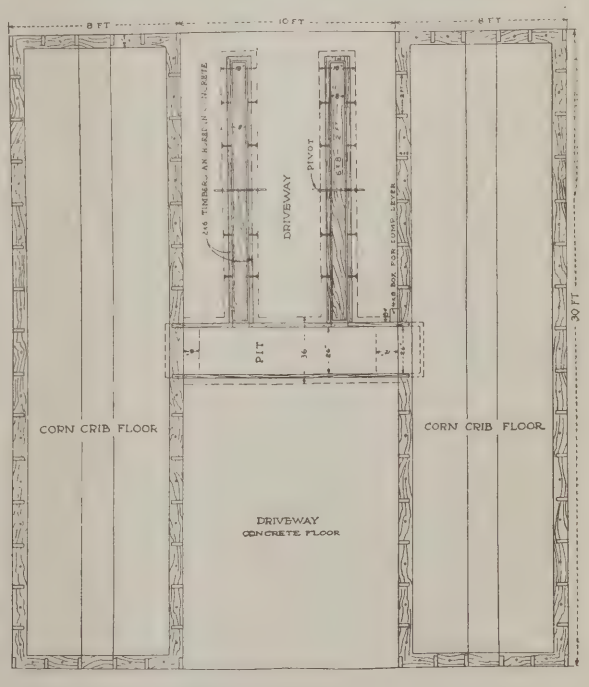
An important feature of the corn crib is the elevator, and for greater economy the building should be comparatively high. The vertical cross section of the crib shows the manner in which the elevator is installed. It may be operated by horse power or engine, according to convenience, and it will be noted that the section that carries the filled cups is enclosed on all sides so that no grain can be spilled or lost. The conveyor folds between the carriers of the elevator.

The corn crib and granary here shown is equipped with Meyers upright cup elevator made by A. F. Meyers Manufacturing Company, Morton, Illinois, and the drawings so clearly indicate the general construction and arrangement that extended description would seem unnecessary.

TALLEST SCHOOLHOUSE IN NEW YORK CITY

What will be the tallest public school building in the city of New York is now in course of construction at the corner of Lexington Avenue and Twenty-second Street in accordance with plans prepared by C. B. J. Snyder, architect of the Board of Education. It is intended for use as the "Manhattan Trade School for Girls," will be ten stories high and constructed of limestone, terra cotta and brick. The foundations present a rather interesting engineering problem, for the reason that forty feet below the surface of the site is an old river bed.

It is estimated that the structure will cost about $480,000.



Floor Plan Showing Driveway, Corn Pit and Position of Elevator

NEW PUBLICATIONS

New Homes Under Old Roofs. By Joseph S. Seabury. Size 12½ by 9½ in. Illustrated by 75 art prints. Bound in cloth. Published by Frederick A. Stokes Co. Price $3.50 net.

Of recent years a wave of appreciation for the work of our forefathers has swept over the country and many are the attempts to save architectural gems of Colonial days from the resistless hand of time. Nowhere is this patriotic effort felt more than in the field of restoration and remodeling of old Colonial homesteads. In most cases, the work is one of love, and no pains are spared to make the restoration true to the epoch and ideals of the historic past.

The book under review is a volume constructed along lines that permit of an excellent idea of just what can be accomplished by a skilled architect along lines of exterior restoration. There are thirty-six examples given, the house "before" and "after" being pictured on facing pages. The illustrations are nearly three-quarter page size and a short caption points out the means by which the transformation was effected. An introductory chapter contains interesting information concerning the development and arrangement of the types of plans usually found in Colonial residence construction. The work is such as to convey a fund of information to all interested in the restoration and remodeling of beautiful houses of the past.

Fire Prevention and Fire Protection for Hospitals. By Otto R. Eichel, M.D. 69 pages, size 5 x 7½ in. Bound in cloth. Published by John Wiley & Sons, Inc. Price $1.00.

There is hardly any class of buildings in which the fire hazard is more to be dreaded than in hospitals. The book under review aims to afford a knowledge of adequate facilities for the protection of this class of structure and provides in convenient form an outline of the principles of fire prevention and protection with indications for their application in institutions housing the sick. It is planned to meet the requirements of architects, builders, superintendents and boards of managers, inspectors and others who may be interested in the subject. Hazards due to lighting, heating, etc., together with chemical extinguishers and similar appliances are considered. The author has had many opportunities to acquaint himself with the best practice along these lines, due to his activities as Director of the Division of Sanitary Supervision, New York State Department of Health.

The Stability of Arches. By Ernest H. Sprague, A. M. Inst. C. E. 150 pages, size 5 x 7½ in. Illustrated. Board covers. Published by Scott, Greenwood & Son, London. American Agents, D. Van Nostrand Co. Price $1.25.

The scientific treatment of the subject of arches first began early in the eighteenth century. Previous to that time the general condition of mechanical science was not such as to permit of the scientific study of the subject and arches were constructed by builders who drew upon practical knowledge and personal experience, traveling from place to place as need for their services arose.

Whether the arch be regarded from its old artistic or newer scientific side, the beauty of its form and the combined lightness and strength of its construction make the subject one of interest to many. The book under review, which is one of the "Broadway Series of Engineering Handbooks," is written by a man thoroughly familiar with his subject. Illustrations consist of five folding plates and fifty-eight diagrams, which, together with the numerous formulae and accompanying illuminating descriptions, can not fail to prove of value to the architect and the builder interested in the subject.

The chapter headings include "The Three-Pinned Arch," "Elastic Theory of the Arch," "The Two-Hinged Arch," "The Hingeless Arch," "Masonry and Concrete Arches," "Design of Masonry and Concrete Arches," "Loads and Stresses," etc., together with an appendix which gives methods used for the calculation of the ordinates of a circular arc.

COURSE IN CONCRETE WORK AT WENTWORTH INSTITUTE

As mentioned a short time ago in these columns, the Wentworth Institute of Boston has just added to its curriculum a course of instruction in concrete work, the idea being to train young men for the position of concrete foremen and contractors. The institute has set aside one of its best laboratory rooms and is fitting it up with modern testing machinery and other necessary equipment in order to make possible various determinations which will illustrate the technical as well as the practical sides of the applications of concrete.

This work, we understand, has been made possible largely by the co-operation of the Extension Division of the Portland Cement Association. We understand that J. C. Donaldson, Field Engineer of the Extension Division, will be located at Wentworth Institute for some time assisting in starting and directing the course in concrete along the lines planned. This departure is, in a sense, new for an institution of the class in which Wentworth Institute may justly be placed, yet is only an extension of the Manual Training in concrete idea which has demonstrated its popularity and appeal in numerous ways during the past year or more. This was most notable, perhaps, in the recent short course in concrete for manual training and vocational teachers which was held during the early part of the summer at Lewis Institute, Chicago, and reference to which appeared in these columns at the time.

Proper ventilation of residences is a phase of building construction deserving of much more attention than it often receives.

CURRENT NEWS OF BUILDERS' EXCHANGES

ANNUAL MEETINGS — OUTINGS — NEW QUARTERS AND MEMBERSHIP CAMPAIGN

Annual Outing of Cleveland Builders' Exchange

THE annual fall outing and dinner of The Builders' Exchange of Cleveland, Ohio, was held in September. Over 250 members, together with a number of architects and other guests, made the affair the largest attended ever given by the Exchange. The afternoon was devoted to various sports, great interest centering in the baseball game between the contractors and the supply men, the latter winning by the healthy score of 30 to 8.

At a membership lunch held on Sept. 25, E. M. Craig, secretary-manager of the Chicago Construction Employers' Association, made an interesting address on the subject of organization among contractors and other employers in the building trades, his remarks being especially timely owing to the recent formation of such an organization under the auspices of the Exchange.

Fiftieth Anniversary of Buffalo Exchange

The fiftieth anniversary of the Builders' Association Exchange of Buffalo, N. Y., will be held in January, 1917, and as the New York State Association of Builders is to hold its next annual meeting in that city, the two events will fit in together nicely.

Secretary F. N. Farrar states that local business in the building trades is improving, and he expects early easement of labor conditions, due to the suspension of various municipal activities.

Annual Meeting of Wisconsin Master Builders

The Builders' and Traders' Exchange of Oshkosh, Wis., is making extensive preparations for the annual meeting of the Master Builders' Association of Wisconsin, which is to be held in Oshkosh from Jan. 10 to 13, 1917. At the September meeting of the local organization a committee was chosen consisting of E. E. Beals, E. L. Mundin, Matthew Mertz, August Pitz, L. W. Dukerschein, E. E. Meelens and O. A. Toner. Each of these committeemen heads a sub-committee which will devote itself to some one phase of the entertainment.

It is planned to organize special visiting parties to the local plants which manufacture building materials, so that the builders may familiarize themselves with the materials manufactured in Oshkosh.

A vote of thanks for his efficient services during the past five years was tendered to Secretary and Treasurer John Edwards, who presented his resignation at the meeting. E. L. Mundin was elected to fill the vacancy.

New Home of Minneapolis Builders' Exchange

That the Builders' Exchange of Minneapolis is in the progressive ranks of such organizations is evidenced by the activity which it has displayed in bringing to a successful completion the movement for a building of its own. The preliminary plans for a twelve-story structure with a terra cotta and press brick front have been drawn by Bertrand & Chamberlin, associated architects, and received the unanimous approval of the members at a meeting held on Oct. 3.

The building is to be located on Second Avenue South, in the business section of Minneapolis, and there is every indication that the property will substantially increase in value. The site of 75 x 132 ft. has been leased for 100 years, with the option of purchase any time within 10 years. Although no effort has as yet been made to secure tenants, five floors have already been taken.

The ground floor is to be devoted to a permanent exhibit of building materials. On the top floor there will be a spacious assembly room, the intervening floors being devoted to offices.

The funds for the project, which is estimated to cost over $250,000, have practically been subscribed by members, and no doubt is expressed but what the investment will be a good one. Much credit is due to the indefatigable efforts of the temporary building committee, which consists of Chairman E. E. Leighton, George Beldon, E. G. Evensta, William Penn, Eugene Young, W. A. Elliot, James Teck, N. W. Nelson and M. Schumacher.

A meeting of the stockholders is scheduled for Jan. 1 for the purpose of electing officers for the ensuing year.

Membership Campaign of the Philadelphia Exchange

The Builders' Exchange of Philadelphia, Pa., held its quarterly meeting on Sept. 26 and much appreciation was expressed for the success of the membership campaign inaugurated last spring. That the organization is a live one is evidenced by its determining not to rest on the laurels already gained, for it has been decided to offer a first and second prize of $50 and $25 respectively in gold in order to spur on the men in a competition to find out who are the two best membership getters during the year. To be eligible for the first prize, a member must secure ten or more enrollments, and to be eligible for the second prize, five or more. Every member was urged to bring friends eligible to membership to the weekly luncheons, which began Oct. 10, and to hand a list of such eligibles to the membership committee.

Buffet Luncheon and Vaudeville by Chicago Builders' and Traders' Exchange

"Don't let a previous engagement keep you from attending the big stag, cabaret and buffet luncheon on Thursday, October 12," was a message received by members of the Builders and Traders Exchange of Chicago a few days prior to this event. The announcement was also displayed in large letters on the Bulletin Board in the rooms of the organization, with the result that a crowd approximating two hundred turned out to participate in the festivities. The suite of rooms on the second floor of the Chamber of Commerce Building were comfortably packed from 4 o'clock on, the members taking the opportunity to renew business acquaintanceships and to make new friends in the building field. Secretary Joe Hendricks had his hands full, for he presided over a long table that was laden down with good things to eat. His invitation to "dig in" needed no second call. In the meantime, a piano furnished music and popular songs were sung by a group of the younger members of the exchange.

At 6 o'clock the cabaret and vaudeville entertainment was staged and amusements continued until 9 o'clock. The affair was informal, and most successful. During the day the officers were present to greet new and prospective members, while several members of the Builders' Club attended, as did Secretary Craig of the Building Construction Employers' Association. Meetings of this character are responsible for the establishment of closer and more cordial business relations among the members, and their popularity is an indication.

BRIEF REVIEW OF THE BUILDING SITUATION

BUILDING OPERATIONS FOR SEPTEMBER SHOW 5¼ PER CENT INCREASE OVER SEPTEMBER, 1915

A RATHER more gratifying situation in the building industry in September is evidenced by the reports which reach us from 128 cities of the country. The notable gains are found in the middle and extreme western sections, while in the East there is a somewhat lessened activity as compared with this period last year. This decrease in the value of projected buildings is due in large measure to the lull in some of the leading cities, notable shrinkages appearing in Philadelphia, Pittsburgh, New Haven, Trenton, Hartford, Bridgeport, Albany and in four of the five leading boroughs constituting Greater New York. The 46 Eastern cities reporting show a loss of 9.22 per cent as compared with September last year.

CITIES OF EASTERN STATES

	Sept., 1916	Sept., 1915
Albany	215,555	340,965
Allentown	74,540	172,675
Altoona	69,309	63,933
Bayonne	126,842	110,453
Binghamton	160,319	115,534
Boston	5,133,000	5,432,000
Bridgeport	547,541	720,260
Brockton	83,991	96,312
Buffalo	1,283,000	987,000
East Orange	403,620	89,233
Elizabeth	165,942	93,834
Easton	50,400	80,000
Erie	217,311	139,761
Harrisburg	406,075	62,175
Hartford	246,497	349,250
Haverhill	60,250	101,850
Hoboken	470,888	9,080
Holyoke	78,700	185,825
Lawrence	181,790	59,795
Manchester	138,536	120,302
Newark	562,728	662,458
New Bedford	380,300	462,550
New Haven	323,994	1,418,499
New York:		
Manhattan	3,336,511	1,348,267
Bronx	780,863	1,311,589
Brooklyn	2,909,469	3,495,913
Queens	1,220,242	1,413,661
Richmond	125,783	244,300
Passaic	119,085	96,162
Paterson	140,027	120,681
Philadelphia	3,301,310	4,731,670
Pittsburgh	1,407,094	2,260,939
Portland	73,017	122,000
Quincy	126,605	112,042
Reading	163,075	62,875
Rochester	664,128	564,845
Scranton	70,648	49,013
Schenectady	170,526	96,830
Springfield	412,615	312,510
Syracuse	542,290	302,315
Trenton	185,674	348,042
Troy	34,040	261,405
Utica	164,110	235,985
Williamsport	4,780	28,850
Wilkes-Barre	109,257	118,002
Worcester	586,550	592,735

In the leading sections of the Middle States or Central West, 40 cities show a gain over last year of 16.27 per cent. This is due largely to notable gains in Akron, Cleveland, Dayton, Detroit, Fort Wayne, Kansas City, Minneapolis, Omaha, St. Louis, South Bend and Youngstown.

CITIES IN MIDDLE STATES

	Sept., 1916	Sept., 1915
Akron	1,893,740	381,925
Cedar Rapids	177,000	129,000
Canton	340,525	294,490
Chicago	8,579,550	8,569,600
Cincinnati	847,515	1,264,444
Cleveland	2,713,780	2,356,620
Columbus	548,065	504,710
Davenport	122,945	81,365

CITIES IN MIDDLE STATES (Continued)

Dayton	605,727	191,975
Des Moines	164,387	218,470
Detroit	4,868,695	2,695,720
Dubuque	57,100	21,450
Duluth	315,668	285,321
East St. Louis	57,235	62,040
Evansville	151,829	102,345
Ft. Smith, Ark	3,100	9,375
Ft. Wayne	2,523,631	1,479,590
Grand Rapids	169,405	205,813
Indianapolis	868,168	1,255,792
Kansas City, Mo	882,790	778,425
Kansas City, Kans	51,460	64,325
Lincoln	119,790	125,713
Milwaukee	840,557	2,815,500
Minneapolis	1,815,565	945,730
Omaha	715,705	359,055
Peoria	186,850	266,170
Richmond	16,175	48,000
Saginaw	31,720	22,700
St. Joseph	48,995	99,035
St. Louis	1,780,518	800,185
St. Paul	582,171	1,302,375
Sioux City	183,750	171,950
South Bend	196,741	38,607
Springfield, Ill	152,082	72,090
Superior, Wis	144,769	178,890
Terre Haute	44,127	37,513
Toledo	676,836	701,648
Topeka	42,601	59,897
Youngstown	395,245	164,430
Zanesville	23,675	20,673

In the Southern tier of States the situation has not changed materially from a year ago, the cities reporting indicating a lessened activity of a trifle more than 1 per cent.

CITIES IN SOUTHERN STATES

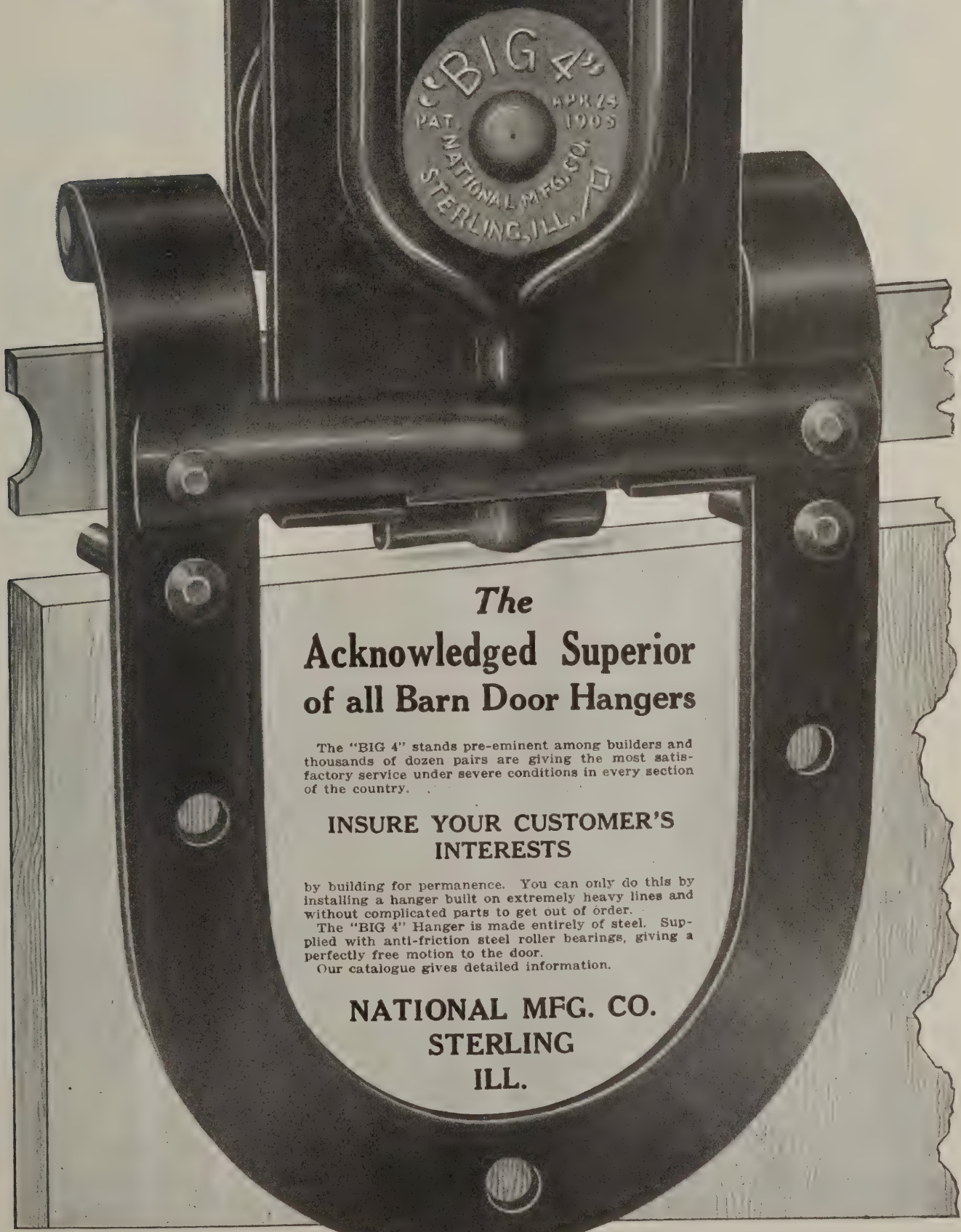
	Sept., 1916	Sept., 1915
Atlanta	243,232	677,745
Baltimore	552,406	595,393
Beaumont	80,080	43,368
Birmingham	302,601	157,934
Charleston	59,475	108,422
Chattanooga	79,272	51,165
Charlotte	276,320	16,660
El Paso	189,530	258,435
Dallas, Tex	752,091	262,202
Ft. Worth	112,323	69,580
Jacksonville	131,450	54,960
Huntington	72,180	103,028
Houston	159,600	263,821
Louisville	198,030	446,750
Memphis	239,685	209,535
Miami	114,770	55,800
Montgomery	21,807	14,302
Muskogee, Fla	12,000	3,545
Nashville	405,880	84,286
New Orleans	208,546	315,819
Norfolk, Va	82,247	130,822
Oklahoma City	190,425	132,745
Richmond	339,455	242,763
Savannah	52,624	64,360
Washington	1,036,994	1,350,442
Wilmington	181,425	258,345

Coming now to the extreme western section of the country, we find a gain of 39.65 per cent as compared with September last year, this being due largely to the greatly increased operations in Denver, Los Angeles, Portland, Sacramento, San Diego, San Francisco, Seattle, and Tacoma.

CITIES IN EXTREME WESTERN STATES

	Sept., 1916	Sept., 1915
Berkeley, Cal	130,100	131,700
Colorado Springs	23,087	17,885
Denver	372,360	194,260
Los Angeles	913,173	828,758
Oakland	439,253	522,597
Pasadena	136,263	193,798
Portland	1,318,780	299,820
Sacramento	233,057	68,474
San Diego	251,309	129,161
Salt Lake City	146,060	284,309
San Francisco	1,263,485	1,086,912
San José	74,071	23,861
Seattle	629,140	471,615
Spokane	163,422	145,000
Stockton	31,550	49,300
Tacoma	142,692	40,613

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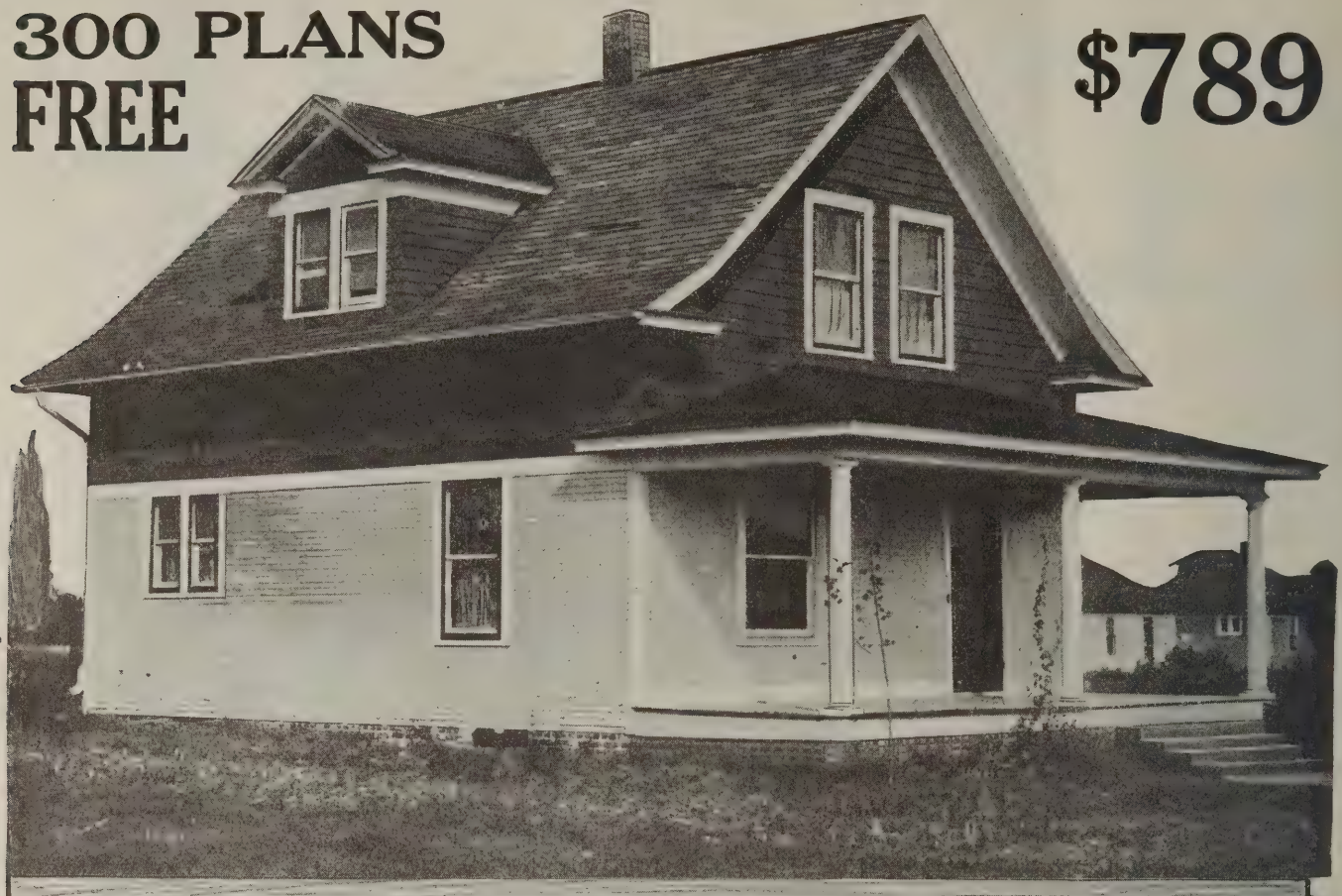
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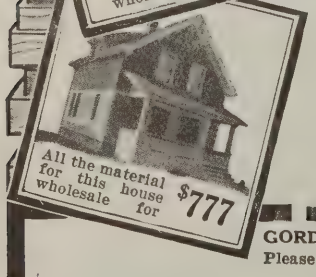
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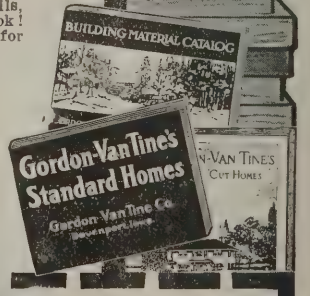




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2011

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

Asbestos Shingles for Farm Barns

In buying roofing to-day the farmer has much more to consider than ever before. He has more varieties to choose from than formerly. But what he is looking for is a permanent roofing that will give lasting satisfaction. He is willing to pay a good price for such a roofing, in return for which he asks fire protection, sightliness, freedom from maintenance expense, and a low cost per year.

To meet all requirements in the demand for more durable safer materials, asbestos is being developed as a roof covering material for use on all types of farm buildings. Principal among these asbestos types are asbestos shingles and roofings in "ready roll" form. For farm residences and high-grade farm buildings the asbestos shingle is peculiarly fitted, since it has architectural decorative possibilities found in a unique range of sizes, shapes and colors, in addition to the necessary qualifications of durability and fire protection. Furthermore, it is so constructed that it may safely be termed indestructible. Asbestos shingles are made of asbestos rock fiber and Portland cement and compressed under hydraulic pressure, the finished product proving to be an all-stone material that will endure the contraction, and expansion of heat and cold without cracking. It is said that age does not weaken these shingles, but, on the contrary, the claim is made that they actually grow stronger in service.

For farm buildings with sloping roofs that require a more moderate-priced roofing than the shingles, asbestos roofings of the ready roll type have been introduced. These roofings are made of asbestos rock fiber, felted into pliable sheets which retain all the rock-like characteristics of the original mineral. To make this waterproofing waterproof and unaffected by weather, these asbestos sheets are thoroughly saturated with natural asphalt, and asphalt is again used as a cement between the plies. Due to this construction, such a roofing carries the assurance that when it is once in place there will be no necessity of frequent painting to keep the material from rotting, cracking, drying out, and eventually developing leaks to require patching. It is essential to note that both the shingles and the roofing of the "ready roll" type are fire-resisting. These roofings are inspected, approved and labeled by the Underwriters' Laboratories, Inc., under direction of the National Board of Fire Underwriters.

The efficiency of a good roof, however, is not always dependent on the material alone. The method of laying has a great deal to do with the service the roof will give. This is particularly true of roll roofings. The commonly used "nail-and-cement-it" method of ap-



Fig. 1—A Good Example of Round Barn Roofed with "Transite" Asbestos Shingles

plying roll roofing will give a good roof under most conditions, but it obviously allows the laps of the roofing to be its weakest point.

This disadvantage, coupled with the smeary and spattered appearance of roofing laid with cement, has led to the perfection of a roofing cleat known as the Johns-Manville Vise-Grip Cleat, which is a strip of galvanized metal nailed on at the laps, in place of the old method of using cement or tin caps and nails. Laid with J-M Vise-Grip Cleats, the lap joints of roofing are literally welded together, forming a secure, waterproof roof. J-M Cleats, by reason of their specially designed shape, exert a strong, continuous gripping pressure along the whole length of the lap. The roofing cannot pull away from their tenacious bulldog grip. For when the roofing pulls and wrenches, the grip of the metal exerts an even, positive pressure that does not relax. The J-M Cleat forms a neat beading, which adds in every respect to the appearance of the roof. The Cleats are supplied with every roll of J-M Asbestos Roofing and J-M Regal Roofing, when ordered.

In Fig. 1 is illustrated a good example of Johns-Manville Transite Asbestos Shingles on a round barn for the farm.

Barn Roofed with "Rex-Tile" Asphalt Shingles

The farmer has the reputation of being a shrewd buyer of materials and equipment that will reduce his maintenance costs, and he has accepted asphalt shingles with the confidence that they make an efficient roof that costs less in the long run. The fire-resisting qualities are of vital importance to the farmer, who usually has no fire-fighting system, for asphalt shingles will save a building if sparks should fall on it from a nearby fire. The Asphalt Shingle Publicity Bureau, 954 Marquette Building, Chicago, Ill., believes that the contractor who is constructing farm buildings has good reason to specify asphalt shingles because they will have a quick appeal to the farmer's judgment. They are made of asphalt and crushed stone, while permanency of color is assured because of the fact that the colors are produced from the rock itself. Their beauty and harmony are illustrated on the dairy barn and silos at Spring Brook Farms, Preakness, N. J., shown in Fig. 2, and which are covered with "Rex-Tile" asphalt shingles, made by the Flintkote Mfg. Co., 98 Pearl Street, Boston, Mass. The owner has every reason to feel proud of appearances in this instance, for the shingles add just that touch of color that does so much toward brightening and enhancing the group of buildings. Many prominent stock farms are using asphalt shingles on their enormous barns where the amount of material involved makes it well worth while to study efficiency. On silos they are especially applicable in that they can be bent or made to fit the curve of the roof so easily. The contractor appreciates the simplicity with which they are put on, and can assure the owner that the first cost covers his entire roofing expense.



Fig. 2—Dairy Barn and Silos at Spring Brook Farms, Preakness, N. J., and roofed with "Rex-Tile" asphalt shingles

Modern Stable Equipment

One of the most important problems in connection with an up-to-date farm is how to obtain thoroughly sanitary and comfortable quarters for the live stock at a minimum of care and labor. Litter carriers, ensilage carriers, merchandise carriers and hoists, etc., all aid considerably in facilitating the transportation problems of the farmer, and these contrivances are illustrated and described in "Modern Stable Equipment," issued by the Glor Bros. & Willis Mfg. Co., Attica, N. Y. These systems, of course, depend greatly upon the track for their efficiency and therefore track and switch construction, together with the manner of installation, are illustrated and described. Information is also given in regard to sanitary steel or wooden cow stalls of various kinds, end guards, stall guards, adjustable steel gates, manger partitions, watering bowls and systems, calf and bull pens, stock pens, piggeries, hog troughs, Buckeye ventilators, spiral stairs, cork brick, etc., for stable floors, as well as other matters calculated to be of interest. The majority of the foregoing are accompanied by instructions for installation, and all are illustrated. The company states that its interest does not end with the selling, but continues until the apparatus is installed, furnishing full descriptions when desired as an aid thereto, or attending to the installation direct as may be preferred.

Globe Ventilators for Farm Barns

That proper ventilation of farm buildings is essential and, in the end, economical, is evidenced by the increasing attention given this important subject by progressive farmers. A type of ventilator which is said to give great satisfaction is that made by the Globe Ventilator Co., 205 River Street, Troy, N. Y. Among the many barns equipped with Globe ventilators mention may be made of those of the State of Vermont Experimental Station at Lyndonville. The first order was given in 1900 for two 24-in. ventilators, and since then, as new buildings have been erected, the company has received re-orders so that at present it has furnished a total of twelve 24-in. and one 30-in. Globe ventilators for the barns in question. Another prominent user of this type of ventilator is the Oconomowoc Farms, which purchased four 30-in., four 15-in., three 12-in. and two 8-in. ventilators, the smaller sizes being intended for the milk house. For its farm at Chilton, Wis., use

(*Continued on page* 81)

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The architects like them, the customers like them. It does me good to walk around and look at those fine looking Neponset roofs—my roofs—and to know that several thicknesses of Paroid weather-proof roofing are protecting my customers from storm, sun and fire. Neponset Shingles are made in red, gray and green.

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Please send me information about Neponset Twin Shingles and Neponset Wall Board. Also a copy of your book, "Repairing and Building." This request does not obligate me in any way.

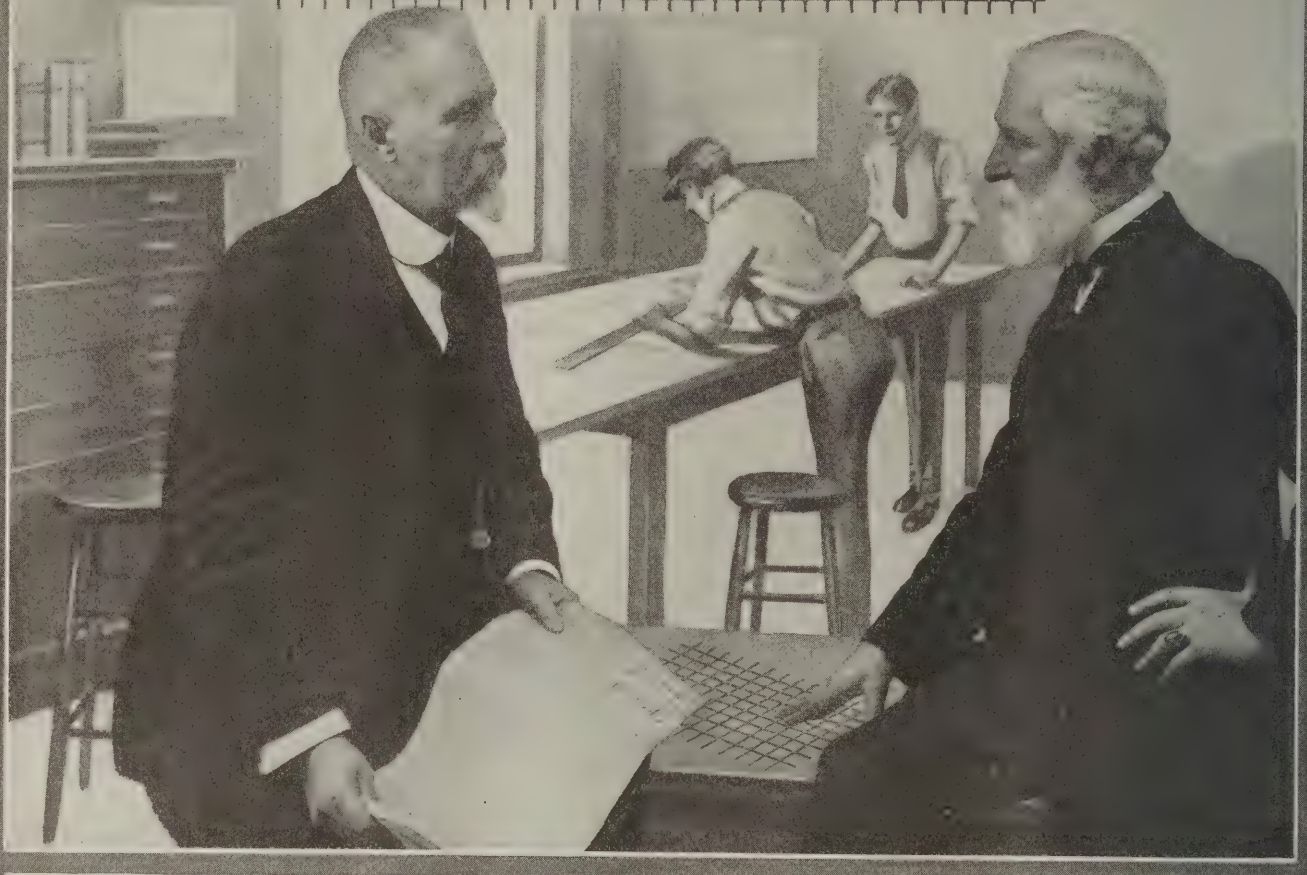
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Fig. 3—One of the Models of a Well Equipped Farm Exhibited by the Southern Pine Association at the "Exposition of a Reconstructed City" Held in Paris

was made of one 24-in. and two 8-in. ventilators, while for the farm at Richland Center, Wis., it used one 24-in., two 26-in. and two 8-in. ventilators.

Model Farms of Southern Yellow Pine

An international reputation was acquired by Southern yellow pine this summer when two model farms, constructed for the Southern Pine Association, Kansas City, Mo., were exhibited at the Exposition of a Reconstructed City, held in Paris, France. The models, which are reproduced in Figs. 3 and 4, are excellent illustrations of the uses to which this wood can be put and the artistic beauty obtained where this material enters in the construction. It is said that on account of its extensive use on American farms it has gained the name of the farmer's wood, and has always met with every farm building need. The wood can be used for all types of buildings and occupies a position of importance in every kind of heavy construction for trusses, beams, joists, rafters, sills—wherever strength and endurance are essential.

The Government Forest Service made an exhaustive and painstaking study of the most important of the commercial woods of this country, and the result of these tests, compiled in a series of comparative tables, pay tribute to the qualities of Southern yellow pine. It will be found desirable for interior finish, and is of uniformly high quality and gives maximum service at moderate cost. The wood is bright and attractive in color. While remarkable strength, stiffness and toughness are qualities that contribute to the endurance of Southern yellow pine, its longevity is due in a great measure to its peculiar structure, and the resin and wood oil, natural preservatives, with which it is impregnated. Its grain is dense, close and even, hardening with age. This wood has been used to a considerable extent for constructing silos, and some of the oldest in existence are built of this material, while its availability and easy working nature make it an ideal all-purpose wood for farm building construction.

The models here shown were made by Fred Wilhelm of 505 West Dayton Street, Madison, Wis.

A Book of Louden Barn Plans

Through the courtesy of the Louden Machinery Co., Fairfield, Iowa, we have received a copy of what is one of the finest catalogs devoted exclusively to barn building design and equipment ever issued by a manufacturer. It has been published by the company's architectural department with a view to assisting its clients to meet their requirements by economical construction and to suggest means of solving problems that come up in connection with proper lighting, heating, ventilation, drainage, disposal of manure, and other sanitary and hygienic problems, as well as the protection against weather exposure and fire risk. There are more than fifty plans of dairy barns, horse barns, hog barns and buildings of a miscellaneous character, each of which is illustrated, showing an exterior view and floor plan, accompanied by a short sketch of the dimensions, capacity and estimated cost, each building being designed for a specific purpose. The index at the back enables the contractor to locate the building that will fill his requirements, and should he fail to find just what he wants, the company's staff stands ready to render assistance that will combine utility and sanitation with economy and strength in the construction. The book has 112 pages, many of which are devoted to detail drawings. A volume double the thickness of the barn book is General Catalog No. 43, devoted to a wide



Fig. 4—Another Model of a Well Equipped American Farm Exhibited by the Southern Pine Association

variety of hay unloading tools, barn and garage door hangers, litter, feed, merchandise and milk can carriers, stable equipment, cupolas, ventilators, drains and hardware specialties. The company has branch offices in St. Paul, Minn., Albany, N. Y., Fort Wayne, Ind., Kansas City, Mo., and Guelph, Ont.

"A Spark May Cost a Farm"

Under the above title there is being distributed among architects and builders throughout the country by the Keasbey & Mattison Company, Ambler, Pa., a very attractively printed publication of twenty-two pages, profusely illustrated with half-tone engravings, showing farm buildings of various kinds, in connection with all of which use has been made of Ambler asbestos shingles of the "Century" brand. The application of the title above is found in the fact that a spark on the roof of a building with a light wind—just brisk enough to fan the leaves on the trees—may cost the destruction of all the buildings on a farm, and from this the lesson is derived that all farm buildings should have their roofs covered with shingles which will not burn.

It is pointed out that the "Century" brand of asbestos shingles are made from cement and pure asbestos fiber, and are therefore practically indestructible. They give the advantage of concrete construction with the additional fire protection assured by the asbestos fibers, and the claim is put forth that these shingles are not affected by extremes of climatic changes.

The striking feature of the publication referred to is the cover design, printed in colors and showing the main group of buildings on the Good Hold Farm, near Mentor, Ohio. The horse barn appears in the foreground, while at the left is the driveway to the office, the creamery, the cow barn, wagon shed, calf and feed barn, celery and hen house, farm implement shed, etc. The photographic reproduction of this group of buildings is here presented in Fig. 5. All the buildings are covered with Ambler asbestos shingles of the "Century" brand. The horse barn in the foreground is 66 ft. wide, 96 ft. long and 85 ft. high. It has thirty-six stalls and three harness rooms and a capacity for 250 tons of hay. It is equipped with such conveniences as cement stalls, cement troughs with cleaning slip, drainage, and four grain shutes holding 1000 bu. each. In the group shown are four cow barns, two being 40 x 100 ft., one 40 x 184 ft. and one 40 x 160 ft.; two dairy barns 40 x 80 ft. and 34 x 120 ft.; one storage barn 40 x 80 ft. and an implement barn 40 x 180 ft., the front portion of which is used for tractor engines, and the back contains bins for 9000 bu. of corn. The three piggeries have accommodations for 250 pigs, the five silos have a total capacity of 900 tons and the chicken house measures 40 x 200 ft. in plan.

Hydrated Lime in Concrete

Hydrated lime as a part of concrete has many virtues claimed for it. The United States Bureau of Standards states that in a test comprising forty waterproofing materials, hydrated lime proved to be the most efficient. It is said to increase the plasticity of the mix, to minimize the danger of honeycombing, aids to secure a better mix of the material and increases the slipperiness of the material so that it flows freely without the use of excessive water. These advantages of hydrated lime are set forth in Bulletin A-2 entitled, "Dependable Concrete," which can be secured by any reader of THE BUILDING AGE upon application to the Hydrated Lime Bureau of the National Lime Manufacturers Association, Arrott Bldg., Pittsburgh, Pa.

Fire Resisting Test of Fenestra Windows

At a recent meeting of the New York State Industrial Commission it placed its stamp of approval on Fenestra solid steel windows as a fireproof window meeting all the requirements of the Industrial Code. This action of the commission was based on the result of a fire test in which three standard Fenestra windows joined by mullions were subjected to a temperature of 1600 deg. for a period of 63 min. and then immediately subjected to a stream of cold water under pressure. The test, which was conducted by Prof. James S. MacGregor at the Columbia University Fire Testing Station, was designed to prove that solid steel windows of the Fenestra type would resist any degree of heat they might be called upon to meet in an ordinary fire. In the course of Professor MacGregor's report the statement was made that, "After the test all three vents of the windows used were opened without difficulty and could be swung closed and locked with ease." The results of the test are of special interest to architects, building owners and to the manufacturers as well, as a handicap is removed to the use of such windows, especially in the State of New York. An old state law practically limited the sale of solid steel windows to units not exceeding 5 ft. wide and 9 ft. high. The demand of manufacturers and owners of buildings, however, was for a steel window such as Fenestra that could be used singly or in combined units of practically any size needed.



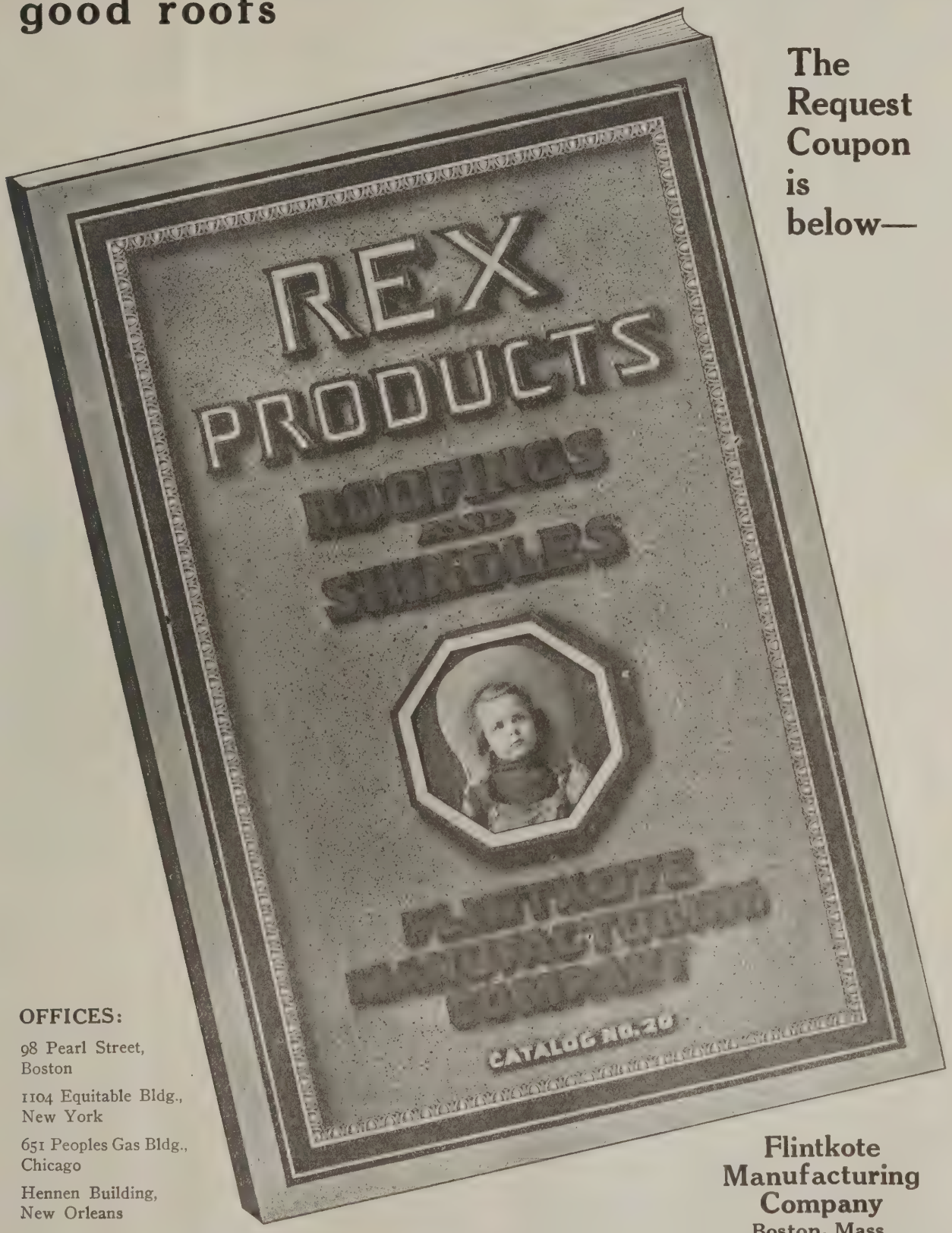
"A Spark May Cost a Farm"—Fig. 5—View of Buildings on Good Hold Farm Roofed with "Century" Asbestos Shingles

"Pecky" Cypress

The advantages of cypress for certain purposes are well known, but "pecky" cypress has, perhaps, not received the attention it deserves. This is the heart wood of the tree and is taken from trees which have been attacked by a certain fungus, which enters from the top of

(*Continued on page 84*)

This Catalog is free to all who need good roofs



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KOHLER Bath Tubs are chosen for the finest hotels and apartment buildings, such as the Edgewater Beach Hotel, Chicago.

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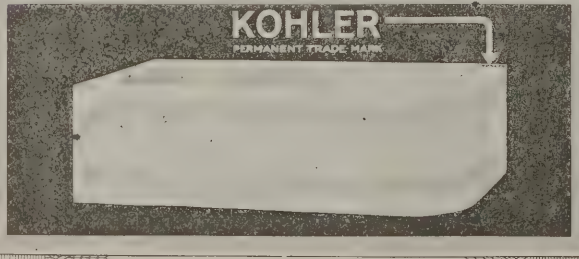
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The "Viceroy," Plate V-14
[Patent Applied For]



the tree and attacks only the heart wood. It flourishes for a time, but soon a counteraction is set up which results in the infiltration of a portion of the wood with curious chemical substances, which give the pecky wood peculiar qualities. These chemical substances are in the nature of a defense evolved by the tree and kill or destroy the fungus. The substances permeate the wood and, being permanent, are said to resist all future attacks which may be made upon the wood. The result is visible in the holes and the process might well be called a tree vaccination. "Pecky" cypress is not as strong as the unattacked wood, but it is said to possess a strength amply sufficient for ordinary purposes.. It is especially desirable for places where a timber with great immunity to rot is needed and as such is very valuable. Halftone engravings of its use in dwellings are contained in volume 2 of the Cypress Pocket Library entitled "Pecky Cypress," issued by the Southern Cypress Manufacturers' Association, New Orleans, La. In addition is a reprint of an authoritative article by Dr. Hermann von Schrenk, the well-known timber engineer, on "Pecky Cypress, Its Nature and Uses," together with other information and illustrations.

Proposition of Union Carbide Co.

Coincident with the manufacture of reliable generators, acetylene, as an illuminant and for cooking purposes, has made itself of value to the 250,000 homes in which it is now being used. With the idea of extending the use of this valuable illuminant and securing the installation of apparatus which are claimed to give satisfactory service, the Union Carbide Sales Co. Dept. 29, Forty-second Street Building, New York City, is urging carpenters and builders to interest themselves in pushing the sale of approved generators. The company is not in any way financially interested in the sale of apparatus, but confines itself solely to the manufacture and sale of Union carbide, and is prepared to refer interested persons to manufacturers of apparatus. This interest is said not to necessitate any investment or carrying of stock, but might be limited to furnishing the names of prospective users to any of the manufacturers who will be glad to make a proposition in respect to this. The company is distributing two illustrated booklets, "Sunlight-on-Tap" and "Artificial Sunlight," in which the growth and merits of acetylene as an illuminant are set forth. The metal package in which the carbide is supplied is shown in Fig. 6.

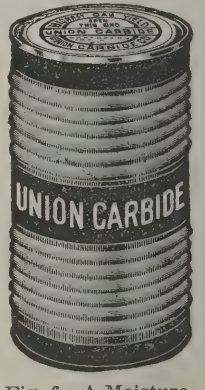


Fig. 6—A Moisture-proof Metal Package of Union Carbide

Ordering Fly Screens in Advance

It is probably safe to say that there is not a screen factory of any importance in the country that is not obliged to refuse good orders for screens each spring; neither is there a screen factory which is not hurried and worried in trying to take care of its business during the spring rush. As a result of this there are tardy deliveries, disappointed customers, hurried work, less durable screens and higher cost. In order to avoid this disagreeable condition of things, fly screens should be ordered in the fall or early winter for spring delivery. Every manufacturer gives preference to the customer who orders this way. If there are any concessions in prices or preference in materials, this is the customer who is most apt to secure them. Each coat of paint has ample time in which to dry, there is opportunity for careful work, a rigid inspection, and shipment is made at the usual time in the spring. In this connection it is interesting to note that the Standard Screen Company, 1848-58 Hastings Street, Chicago, Ill., has one of the largest and best equipped factories in the West, devoted entirely to made-to-order screen work. On account of the extensive equipment necessary and the output of the factory which we understand amounts to nearly a half million screens a year, the company is in

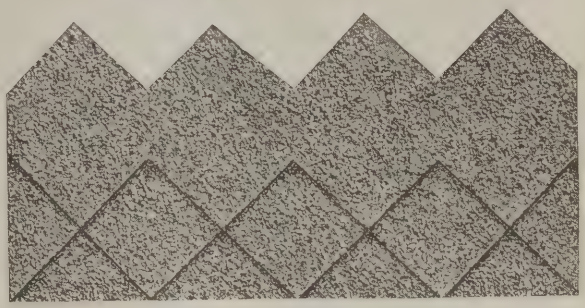
(*Continued on page 86*)

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The roofs you build must endure extremes of heat and cold. They must endure long spells of drought, of rain. They must endure—without deteriorating—a constantly varied attack for *years of service.*

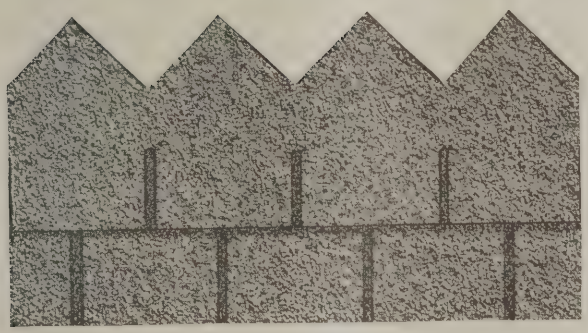
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The endurance and fadeless beauty of FLEX-A-TILE Shingles is *built into* them by the unequalled Heppes method of manufacture.

Pure wool felt is saturated with twice its weight of high-melt, oil-free asphalt; over this is laid a coating of tough, rubber-like gilsonite, and into this is compressed under tons of pressure the beautiful crushed slate or granite surfacing. The result is a shingle that wears like iron—cannot rot, rust, split or curl and only grows richer in color with age.

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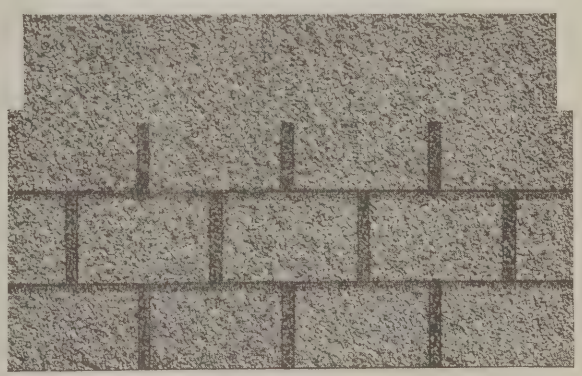
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The Wheel of a STERLING WHEELBARROW

and its

Pre-Lubricated Bearings

When all's said and done, the difference between a good wheelbarrow and a poor one is mainly in the wheel and its bearings.

In making the Sterling Wheel we first upset the shouldered Steel spokes into the heavy steel rim, as shown in Fig. 1.



Fig. 1—Spokes into rim ready for casting the hub.

Then the long sleeved steel hub is set into a special shaped mold, and molten iron is poured into the mold, cementing spokes and hub into one solid piece, as shown below in Fig. 4.

The steel sleeve of the hub is fitted with pre-lubricated fiber bushings, as shown in Fig. 2.

These bushings are filled with a composition of oils which thoroughly penetrate the pores. The bushings are then driven into the hub under great pressure. The longer the cold drawn steel axle turns in these bushings the smoother they become, and they **never** require oiling.

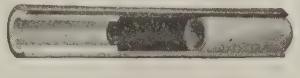


Fig. 2—Pre-Lubricating fiber bushings.

This bushed hub revolves round the axle. Note that it fits into recesses in the end-brackets (see Fig. 3). This construction affords valuable protection against sand and dirt.

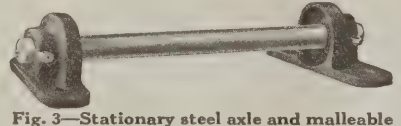


Fig. 3—Stationary steel axle and malleable end brackets.

The axle is cold drawn steel. See how it is keyed to the end-brackets with cotter pins, and how the malleable brackets themselves are secured to the bottom of the nose-end of the handles. There are no nuts to work loose; no side play; nothing to get the "ricketts."

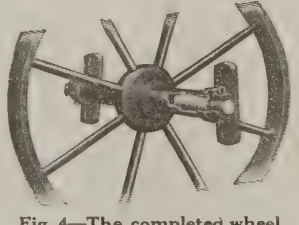
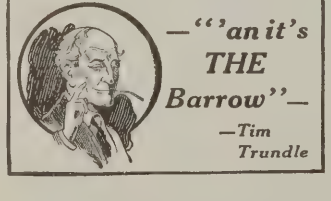


Fig. 4—The completed wheel

This is a **real** wheel, friends; built to last; a wheel that ensures light, noiseless traveling under the heaviest loads.

There are a lot of other exclusive features about the Sterling Wheelbarrow, but its wheel alone is enough to make the discriminating buyer give it a very decided preference.



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Makers of Patent Ribbed Channel Steel Foundry Flasks, Snap Flasks, Skim Gates, Wedges, Foundry and Contractors' Wheelbarrows and Carts, General Wheelbarrows, Trucks, Carts, etc.

position to make better screens and make them cheaper than is the case in small factories with incomplete equipment. Contractors and material dealers who desire to add to their income during the winter season can obtain interesting information in the way of prices, etc., by corresponding with the company.

Catalog of Stearns Hardware

An attractive "Catalog of Hardware" for 1917, bound in flexible cloth and containing a comprehensive index, has just been compiled by E. C. Stearns & Co., 400 Oneida Street, Syracuse, N. Y., and is being issued gratis to the trade. Of special interest is the floor scraper No. 10, which is intended for use on large surfaces and the merits of which were set forth in these columns some time ago. The catalog is profusely illustrated and most of the contrivances are described, prices, etc., of all being given. Other matters contained which will prove of undoubted interest and value to our readers are the various door locks and hinges, mitre boxes, saw vises and sets, door frame and concrete "form" clamps, cement workers' tools, etc.

Catalogs of Barn Equipment

A ventilating system will be found eminently successful where the equipment is designed especially for the conditions under which it is installed. The policy of the King Ventilating Co., Owatonna, Minn., is to make a study of the individual requirements and each system consists of three units—the King aerators on the roof, the foul air flues and the fresh air intakes. The practical methods followed by the company are explained in two illustrated booklets entitled, "The King Aerator" and "King Ventilating System for Creameries." Some interesting data is presented in demonstrating that the King system is scientifically correct and mechanically perfect, with particular attention given to the principles of ventilation.

"Make More Dairy Profits" is the title of an interesting catalog that is published by the West Bend Barn Equipment Co., West Bend, Wis. The company takes the stand that good standard barn equipment will reduce labor costs and add to the comforts of the herd. Work can be done in less time with West Bend automatic swinging stanchions, litter and feed carriers, because of their improved labor-saving devices. A line of individual watering foundations and governing tanks is made and other modern farm equipment.

The modern hay mow is not complete without the proper equipment to handle the hay quickly. The Strickler wide mouth swivel and reversible steel track carrier, grappling forks and structural accessories are made by the Strickler Hay Tool Co., Janesville, Wis., in addition to feed and litter carriers, stanchions, adjustable mangers, watering bowls, steel pens and stalls. These products are described and illustrated in three catalogs, any of which may be had on application.

Every practical dairyman knows that water in the dairy barn is as essential to producing good milk in the winter when the cattle are housed constantly in the barn as a spring of running water in the pasture. The F. Rassman Mfg. Co., Beaver Dam, Wis., manufactures the "Simplex" improved watering bowls that are sanitary and independent of every other bowl on the system. They are easy to clean, being hinged to drop, permitting a positive cleaning to the last settling. The bowls are 10 in. in diameter and operate on either gravity or pressure systems. Catalog No. 8 is evidence that the company's equipment is being specified for installation in modern barns.

An automatic litter carrier system that is practical, efficient and economical is made by the Drew Carrier Co., Waterloo, Wis. An interesting feature in this labor-saving device is made possible by the flexibility of the wire. When the carrier is loaded in the barn and shoved it will travel out of the barn clear to the end of the trolley, dump itself and return to the point where it started. The trolley wheels are equipped with noiseless roller bearings, and an improved stay-on keeper prevents the trolley wheel jumping the track. The carrier has galvanized steel bottoms, sides and ends, reinforced

(*Continued on page* 88)



Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as he expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

Occupation.....

City..... State.....

Double Your Daily Delivery

FEDERAL

Motor Trucks Have No Daily Endurance Limit

Read how Wm. H. Meyers of Bennington, Vermont, got an extra day's work from his Federal truck.

He writes: "On August 1st one man with our truck covered 86 miles over hilly country roads. From 7 A.M. until 7 P.M. he delivered 2050 gallons of gasoline. This is an exceptional record—as 1100 gallons on these trips is considered an unusual day."



FEDERAL Doing Big Things for Dickinson in Detroit.

Two days' work in twelve hours!

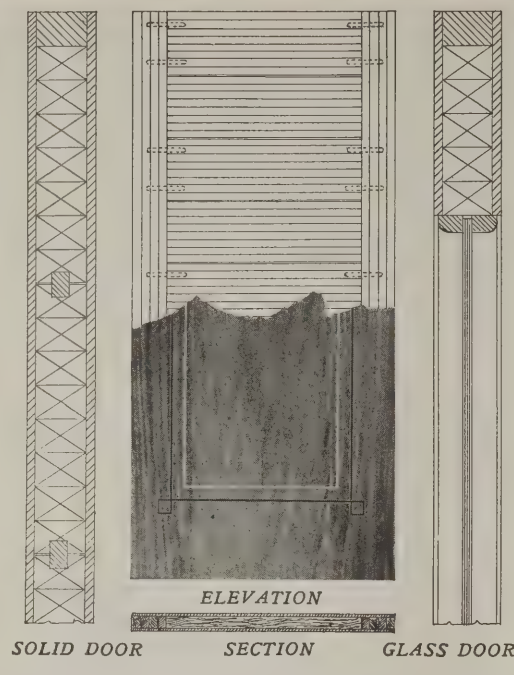
And yet Federal stamina—speed—efficiency—are making the "impossible" task an average day's work—the country over.

You, too, can do more business—reach more customers—give speedier service—render more satisfaction—by Federalizing your delivery problem.

Send for "Federal Traffic News." It will tell you about many other instances of remarkable savings made by Federals on the job.

The FEDERAL Motor Truck Company

Detroit, Michigan



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

Manufactured by

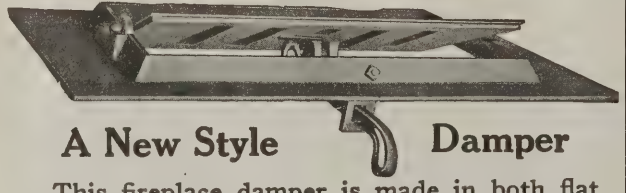
HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

FIREPLACE

MATERIAL



A New Style Damper

This fireplace damper is made in both flat and dome styles. The lever sets under the first row of brick, unexposed, but very accessible and easily operated.

Also made with lower lever so a steel angle can be placed under edge of damper. We make several other style dampers.

Catalog 1590 shows these Dampers in detail and gives valuable suggestions as to the best construction for fireplaces.

Other Goods We Make

Cleanout Doors, Ash Trap Doors, Cast Chimney Thimbles, Brass Thresholds, Andirons, Fire Baskets, Fire Sets, Fire Screens, Spark Guards, Gas Logs, Door Knockers, Sink Brackets, Screen Door Hinges, Double Acting Hinges, Cast Iron Sash Pulleys, Furnace Pulleys, Stove Pipe Registers, Dampers, Damper Clips, Saw Vises, Door Latches, Foot Scrapers, Chest Handles, Flush Rings, Harness Hooks, House Numbers, Door Pulls, Samson Wind Mills, Feed Mills, Alfalfa and Ensilage Cutters, Gasoline Engines.

Stover Mfg. & Eng. Co.

747 East Street

Freeport, Ill.

SEND COUPON TODAY

Stover Mfg. & Eng. Co., 747 East St., Freeport, Ill.

Send the undersigned information regarding your

Name .....

Business .....

Address .....

.....

by angles and malleable castings to give rigidity and strength. This is but one of the many products made by the company, all of which are carefully described and profusely illustrated in a 64-page catalog.

Hydraulic grain handling equipment is the specialty of Camp Bros. & Co., Washington, Ill., and the company is prepared to furnish hydraulic jacks, elevators with tilting and swinging hoppers, vertical or stationary cup elevators, portable elevators adjusted to the cupola in the roof, and conveyors. The company has issued literature which goes into minute detail of the numerous constructive features of all equipment and explanations are such as to leave nothing to the imagination.

The C. A. Libbey Co., Oshkosh, Wis., is one of the large makers of modern barn equipment in this country and operates a large two-story factory exclusively for this purpose. In addition to supplying all that is necessary for installation in dairy and stock barns, horse stables, etc., the company stands ready to serve its customers by making suggestions for the placing of stalls, pens, carrier systems, etc., in new or remodeled barns. This service is free and can be taken advantage of by the contractor who wishes his problems solved by experts with many years' experience.

The rural contractor's knowledge of modern barn equipment will be profitably agumented if he investigates the line manufactured by the Mitchell Mfg. Co., Milwaukee, Wis. A complete catalog of stanchions, cow stalls, carriers, pens, water and ventilating systems will be sent to contractors desiring information on a variety of products that can be used on the farm with economy and at a comparatively low initial cost.

Arkansas Soft Pine for Farm Use

A striking example of the durability and paint-holding qualities of Arkansas soft pine is to be found in the country town of Chatsworth, Ill., where the grain



Fig. 7—Use of Arkansas Soft Pine in Grain Elevator Construction

elevator, built in 1902, and shown in Fig. 7, is still in first-class condition. The Arkansas Soft Pine Bureau, Little Rock, Ark., contributes the interesting information that the building was sided with Arkansas soft pine and has been painted at reasonable intervals. The paint has never scaled or peeled, and has been renewed only when the action of the atmosphere and dust made it imperative. The bureau recommends this wood for constructing all types of farm buildings where dependability, economy and permanency are desired.

(*Continued on page* 90)

PORTER Barn Fixtures Give a New Meaning to Farm Work



MODERN PRACTICAL BARNS

With the Free Co-operative Service rendered by our special planning department, all contractors and carpenters are able to build attractive barns which are conveniently arranged and contain modern ideas throughout.

Investigate This Service—NO EXPENSE—NO OBLIGATION—Do It Today

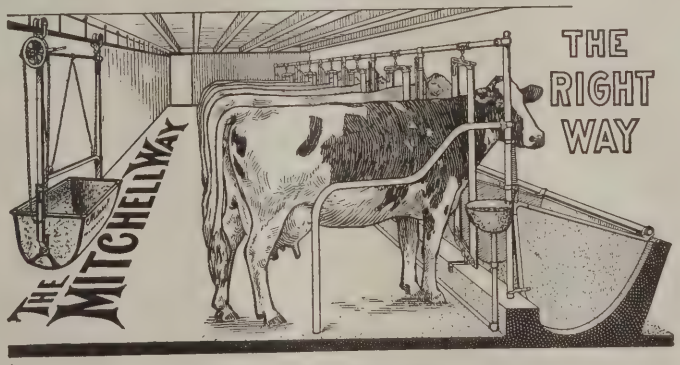
Send us the names of those who expect to build or remodel and ask for the new Barn Equipment Catalog No. 62—It is free.

BARN EQUIPMENT—HAYING TOOLS—DOOR HANGERS

The Combination—A well Planned Barn with Porter Fixtures

J. E. PORTER CO.

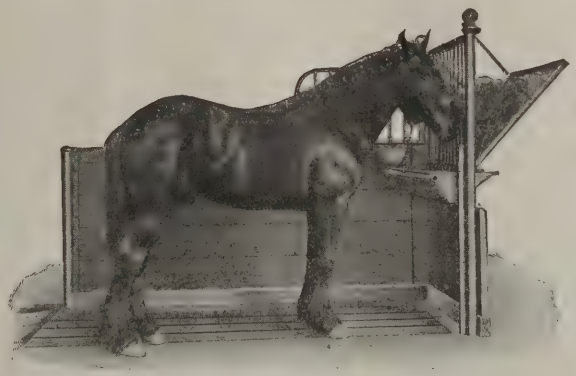
638 Fremont Street Ottawa, Illinois



Mr. Contractor

Don't Let This Opportunity Get Away From You

It will pay you well if you will take a few minutes to investigate this proposition. Barn equipment is in great demand now. Farmers appreciate the importance of first-class equipment, so they are just ripe prospects.



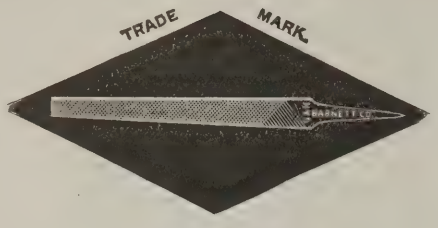
Mitchell Equipment

is answering the call. Four patterns of Stanchions, five styles of Cow and Horse Stalls, thirty styles of Litters, Milk and Feed Carriers. Pens, Water System and Ventilating System. It will take you but a few minutes with our literature to see the possibility with the Mitchell Equipment. Send for a complete Catalogue.

MITCHELL MFG. CO., 2955 Forest House Ave. MILWAUKEE, WIS.

Black Diamond File Works

ESTABLISHED 1863 INCORPORATED 1895



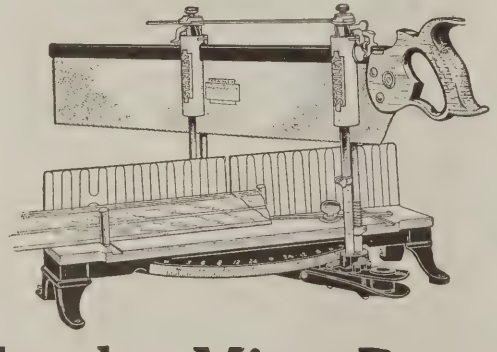
TWELVE MEDALS
of award at International Expositions

SPECIAL PRIZE
GOLD MEDAL
AT ATLANTA, 1895

Copy of Catalogue will be sent free to any interested file user upon application.

G. & H. Barnett Company
Philadelphia, Pa.
Owned and Operated by Nicholson File Company

Stanley Tools



Stanley Mitre Boxes

are constructed on entirely novel lines and embody exclusive and important features not to be found in any other mitre box. They are thoroughly mechanical in design, have all parts made by jig and template, consequently interchangeable.

They are compact, strong and durable, are quickly and easily put together or taken apart for ease in carrying, have the greatest strength with the least weight, and will do the widest range of work of any mitre box made.

See Catalogue for complete details.

Manufactured by

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

One of the features of Arkansas soft pine is that it contains a low percentage of rosin. It does not "gum" the carpenter's tools or power-driven saws, while its use on outside walls permits of the absorption of sufficient oil and pigment to bind paint to the surface. Because of the tough, resilient fiber of the wood, the tendency to split when nailed is reduced to the minimum, and the workable character of the wood makes the tightest knife joints possible—a factor that is vitally important in the construction of wind-resisting framework. The non-split feature is a further advantage when using this wood for roof sheathing, the tough fiber gripping the shingle nail tenaciously and insuring a securely fastened roof covering. The bureau has published many handsome pieces of literature on the numerous advantages of Arkansas soft pine, notably "Not a House, but a Home," "A Dependable Wood for Farm Use," and the "Architect's Manual," any of which may be had free of cost on application to the Bureau.

Parks New Combination Pony Planer

The increasing expense of lumber and labor renders machinery that will reduce these costs worthy of more than passing interest. Of the many devices designed to aid in the lowering of the cost of production one of the most recent possessing features of interest to the carpenter-contractor and builder is the combination machine which has been placed upon the market by the Parks Ball Bearing Machine Co., Station A, Cincinnati,

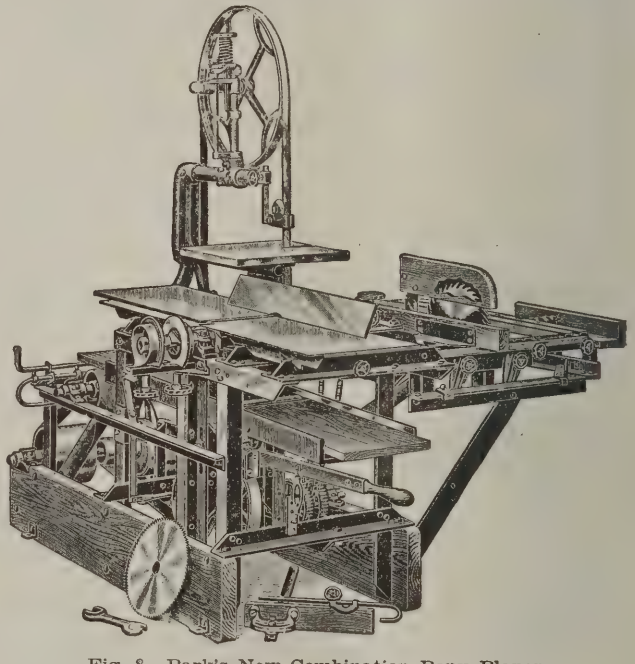


Fig. 8—Park's New Combination Pony Planer

Ohio, and a view of which is shown in Fig. 8. The jointer on this machine can be used the same as any other hand jointer, and by passing material back under the cutter head it is planed to the desired thickness. The planer attachment has self feed with two speeds. The planer head and circular saws are on separate mandrels, with friction clutches to start and stop independently of each other. The band saw has a belt shifter to start and stop independently. The moulder on the side of the machine has double heads so circular mouldings can be made by passing from one side to the other. It is said that sufficient power to run the machine can be furnished by a 5 h.p. engine or motor.

The Durability of California Redwood

The rot-resisting feature of California redwood is strikingly and attractively set forth in a folder just issued by Edwin E. Myers, secretary-manager of the California Redwood Association, the little folder being a companion to the one on fire retardance, which made its appearance several weeks ago. The California Redwood Association in its campaign to bring prominently to the attention of the consumers the merit of redwood, intends to use these two features, and it is admitted

(*Continued on page 92*)



Delchester Farms, Malvern, Pa.
Contractor: Jacob Myers & Son, Philadelphia

Up-to-Date Farm Buildings

on

Kno-Burn

(Trade-Mark Registered)

Expanded Metal Lath

The farmer is just beginning to appreciate stucco construction. He has just come to realize its economy in upkeep and the great safety factor of its fire-resisting qualities.

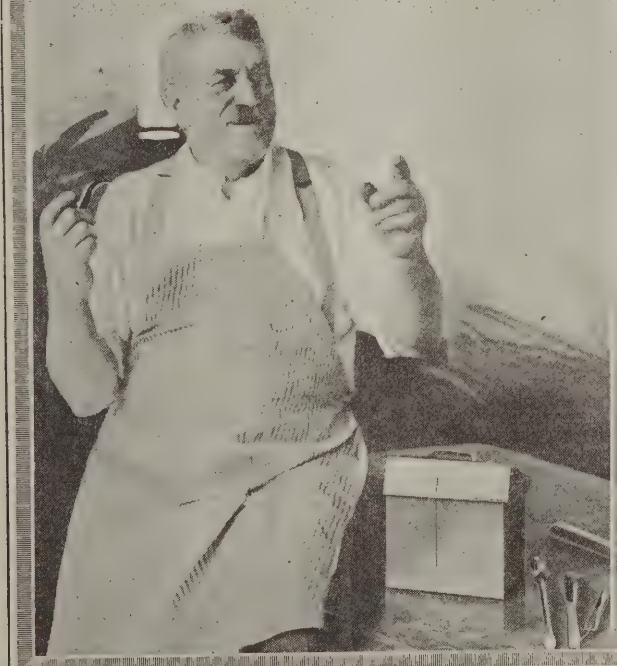
Stucco on a base of KNO-BURN Expanded Metal Lath is fire-proof. It withstands the most severe weather conditions. It costs hardly any more than the **cheapest** plaster base.

Are you cashing in on this great, new field for stucco? Now is the time to get ready. Now is the time to get posted. Let us send you "Kno-Burn Expanded Metal Lath" today. Ask for Booklet 43.

NORTH WESTERN EXPANDED METAL CO.

904 Old Colony Building **Chicago, Illinois**

Pete Says:
"There's as Much Difference in Sharpening Stones as there is in Tools."





THERE are some tools that fall down on the job, there are others that give service—it's the same with sharpening stones, there are some that merely rub the edge on the tool, that fill and won't hold their shape and then there are

Carborundum Sharpening Stones

Clean and quick-cutting, positively uniform and they won't glaze if properly used. They hold their shape, show long life, always ready for work.

There is nothing harder, sharper or faster-cutting than Carborundum

Your hardware dealer can supply you or order direct

.....

The Carborundum Company
Niagara Falls, N. Y.

HAMMER LBR. CO.

The Secret of the Old Colonial House Was in Its Good Roof

HAMMER LBR. CO.

It was covered with Hand-Made Clear Heart Cypress Shingles—and to this day we find many of these old houses, built years ago, whose roofs are in perfect condition.

These Shingles are still obtainable, made in exactly the same way—and from the best of the Cypress tree.

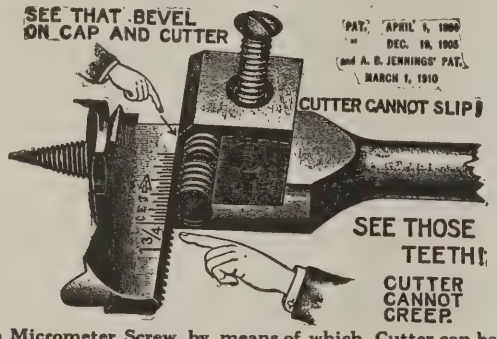
HAMMER BRAND

Split and Shaved Heart Cypress Shingles

Made Entirely by Hand

The HAMMER LUMBER CO., Franklin Bank Bldg. Philadelphia

C. E. JENNINGS STEERS PATENT **EXPANSIVE BIT**

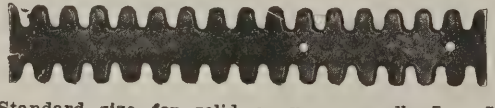


Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. *Sole Mfrs.* **71-73 Murray St., N. Y.**

The word "WHALEBONE" before Wall Ties means a permanent construction when placed.

Don't order Wall Ties from your dealer. Order Whalebone Wall Ties and get the best.



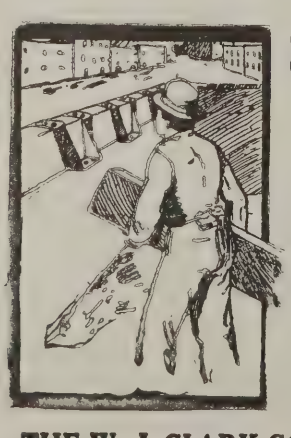
Standard size for solid or veneer walls 7 x ⅞", weighing 50 pounds to the thousand.

If your dealer can't furnish "Whalebone," wire us at our expense the following:

(Name of dealer) can't furnish Whalebone, (Express, Freight) (number) boxes. (Your name).

We will ship the same day from our factory or from the nearest dealer handling the Whalebone and guarantee satisfaction in every respect.

Allegheny Steel Band Co., 886-888 Progress St. Pittsburgh, Pa.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, acauat load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

that they have a battery of big guns of great power. The folder on rot resistance declares that the secret of the "Big Trees" of California is their defiance to rot and fire.

The folder is printed in color and carries on the cover a photographic reproduction of a redwood tree that lived 900 years as a fallen log in the woods. This tree was straddled by a redwood which, when cut down, was found to be 900 years old—indisputable evidence that the fallen giant had lain nearly 1000 years on the floor of the forest while there grew up around it another majestic redwood. The fallen tree by its rings shows it to have been 600 years old before it fell.

Large quantities of these folders on fire retardance and rot resistance of redwood are being distributed and copies will be sent to all who address Edwin E. Myers, Secretary-Manager of the Association, 711 Call Building, San Francisco, California.

Wallboard for Farm Buildings

Many and varied are the uses to which wall board has been put by reason of its wide adaptability, and the novel application of the material as a ceiling for the cow barn at the Green Acres Farm, Manchester, N. H., will doubtless interest many. As shown in Fig. 9, which represents a view down the main feedway, the joints of the walboard are covered with battens, and it is said that the ceiling presents a smooth, sanitary surface. The makers of the wallboard shown in the picture are the Roberds Mfg. Co., 101 Spencer Avenue, Marion, Ind., who recommend "Ideal" wallboard for



Fig. 9—Wallboard for Farm Buildings

use in the construction of all sorts of farm buildings of the lighter types of construction. It is said that with a few 2 x 4's for framework and by the use of walboard, buildings can be quickly erected. The claim is made that wallboard can be used for both side walls and roof on the smaller type of buildings by keeping the surface of the board well painted.

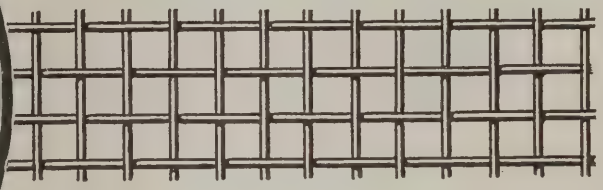
The National Line of Builders' Hardware

The mass of detail that confronts the owner and contractor in the preparation of specifications for a new building is oft-times responsible for the acceptance of materials or equipment the merits of which have not been fully discussed. This is often true in connection with the smaller items entering into the construction. The question of using high grade hardware in the home, farm building or factory is very important, and the matter should not be dismissed by merely saying offhand that anything will do. In this connection the contents of the 96-page catalog of the National Manufacturing Co., Sterling, Ill., will be found of interest. The contractor doing business in farming communities will find within its covers a fine selection of rigid barn door hangers, bumpers, latches, hinges, door pulls and other necessary hardware. The policy of the company, since its organization in 1901, has been to give its customers a better quality of goods and prompt shipment without substitution. In the construction, the company reports that only the best materials are used and finished prod-

(*Continued on page* 94)



A Prominent Feature
of the recent
WORLD'S SERIES



The Building that Held the Enormous Crowds at Brooklyn

The Dome in the Rotunda of the Grand Stand at Ebbets Field, Brooklyn, is the largest dome in the world in which wire lath is used.

A building of this kind must be substantial, lasting and above all—SAFE. The best material was used throughout, and the most notable part of the Dome is that WRIGHT WIRE LATHING was used in its entirety.

WHEN YOU BUILD—USE "WRIGHT" WIRE LATHING.
Fire-proof, Sag-proof and Time-proof. Be sure to specify "WRIGHT."

Send for Our Catalog X Describing the Use of Wright Wire Lath in Reinforcing

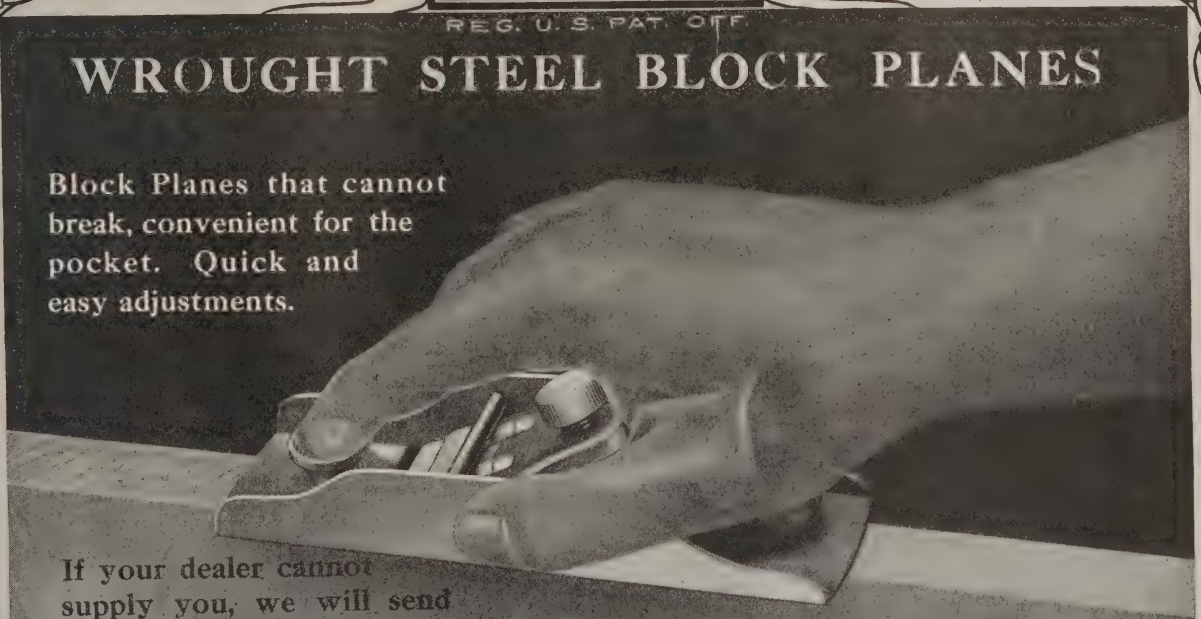
WRIGHT WIRE COMPANY,
WORCESTER, MASS.

BRANCH OFFICES AND WAREHOUSES AT
BOSTON NEW YORK
PHILADELPHIA CHICAGO SAN FRANCISCO

SARGENT
REG. U. S. PAT. OFF.

WROUGHT STEEL BLOCK PLANES

Block Planes that cannot break, convenient for the pocket. Quick and easy adjustments.

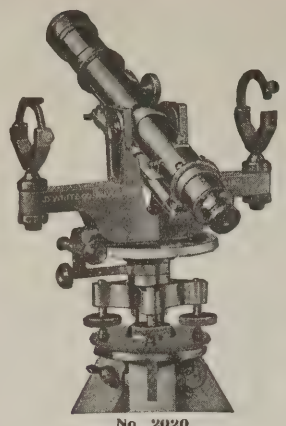


If your dealer cannot supply you, we will send prepaid, on receipt of the price,

No. 5206—6-inch Nickel Plated Plane, $1.00
No. 4206—6-inch Polished Plane, - 90 cents

For full description of Sargent Warranted Planes, send for the Sargent Plane Booklet.

SARGENT & COMPANY, Makers of Planes squares and Mechanics' Tools
53 Water Street, New Haven, Conn.



No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.

Pullman

ALL STEEL Unit Sash Balances



Noiseless

Is the word that describes the operation of the Pullman Unit Sash Balance. All parts are in the casing—nothing can rub or interfere with the spring action. There is nothing to squeak, rattle, bang or stick. Once installed and it will never require contractors', builders' or architects' attention. There is in every Pullman Sash Balance satisfaction for owner and builder alike. Guaranteed for 10 years.

Our catalog with blue print gives full particulars. May we send one?

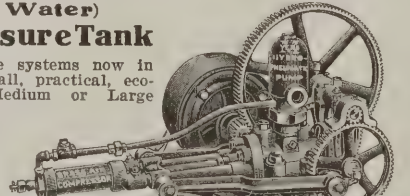
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the many conveniences found in a modern home is a Handy Water Supply, and any home—no matter where located—can now have running water for the bath room, kitchen, laundry, etc., by installing a

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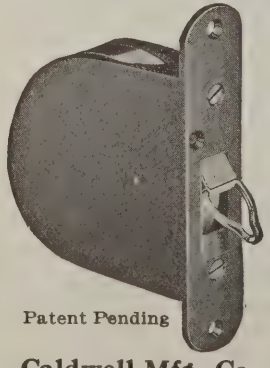
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ucts are turned out by expert workmen operating modern machinery. A complete stock of all items listed in the catalog is carried at all times and orders filled the day they are received. The company makes "hardware for hard wear" and invites correspondence from progressive contractors.

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An attractive copyrighted pamphlet of 24 pages entitled "Saw Points" has just been issued by Charles Morrill, 102 Lafayette Street, New York City, N. Y. It is stated that the pamphlet is compiled from leading authorities and therefore illustrates the best saw practice of the day, the claim being made that by following the instructions given anyone can properly fit a saw. Numerous illustrations picture various bevels on the different kinds of saws and the matter contained is such as to appeal widely to those of the trade interested in saws.

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An improved form of storm sash hanger made of wrought steel, thus rendering it heavy and strong, has recently been added to the extensive line of storm sash hardware made by the Stanley Works, New Brit-

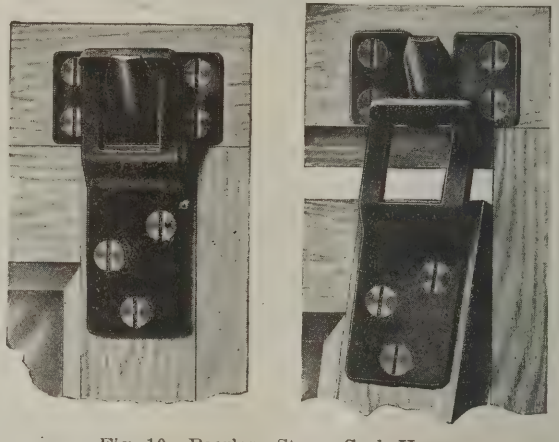


Fig. 10—Peerless Storm Sash Hanger

ain, Conn. The hanger is known as No. 1715, and views of it are presented in Fig. 10, one showing the hanger in place and the other showing the sash detached. The angle on the hook and on the head of the eye guides the eye up and over the hook so that a sash or screen may be hung easily and quickly from the inside of the building. It is necessary only to set the storm sash in its proper grove in the casing and then using the groove as a guide to push up the sash. The eyes slide over and on to the hook, while the weight of the sash clamps down the eyes into place. The point is made that when the sashes are being hung or removed they need not be held far from the building, therefore there is no danger in hanging or removing them from the inside of a window equipped with the hanger illustrated herewith. The hanger is furnished with japan finish and Stanley Sherardized. The eyes or hooks may be ordered separately either from the company at New Britain or from their New York office, 100 Lafayette Street, or from their Chicago branch, 73 East Lake Street.

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You can make Art Marble Wainscoting, Tiling and Composition Floors for a Hall, Vestibule, Bath or Fire Place almost as cheap as hard wood.

ART STONE CO., Box 500 **Waynesboro, Pa.**



The Building Age

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A stucco house brightened up with these stains looks 100 per cent better, and the stucco is protected from dampness, freezing and crumbling, because the Stains are rainproof. They cost far less than the heavy paints or coatings, and they can be applied twice as quickly and easily. They don't cover the stucco with a painty coating, but preserve the natural texture in nice, soft tints that are artistic and pleasing.

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Cabot's Shingle Stains, Heat- and Cold-proof "Quilt" Old Virginia White, Waterproofings, etc.

More Money for You



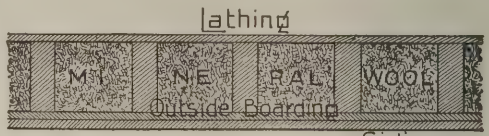
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Section of Outside Wall of House, Showing Wool Between Studding.

Mineral Wool for Building

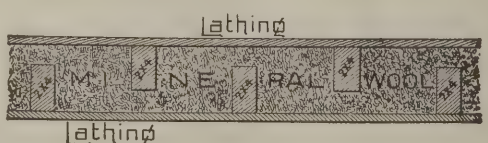
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BUILDING AGE

NEW YORK, DECEMBER, 1916



COTTAGE OF MR. L. D. HUDSON AT PELHAMWOOD, NEW YORK—ARCHITECT, W. S. MOORE

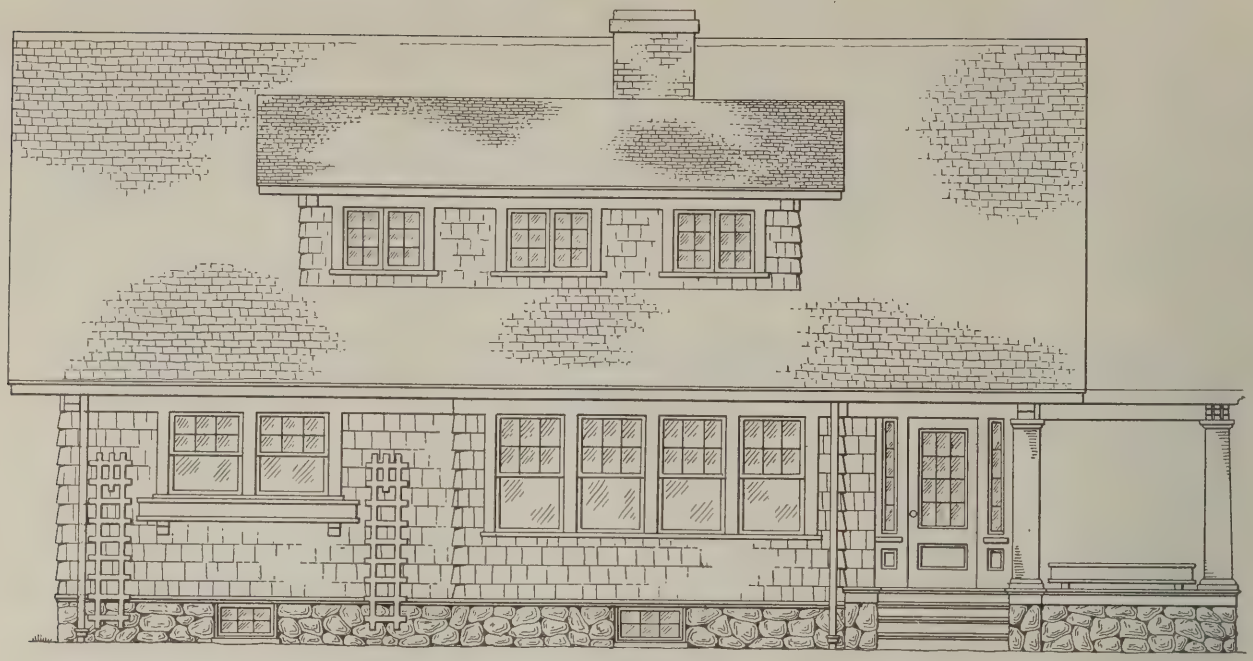
FRAME COTTAGE IN A NEW YORK SUBURB

A DESIGN OF THE SEMI-BUNGALOW STYLE ADAPTED TO THE CLIMATE OF NEW YORK STATE

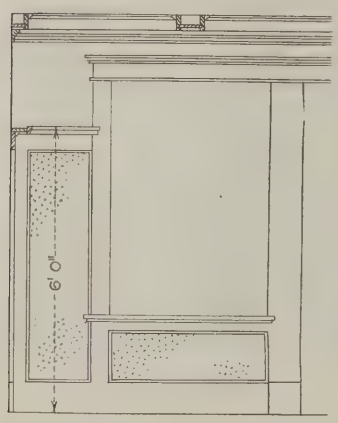
THE interest manifested in attractive country houses of moderate size and cost is the direct result of a growing demand for dwellings of compact and convenient plan. It is also desirable that the architectural features be such as to command attention by reason of their excellence of balance and design. Houses which typify this modern tendency are therefore of great interest to the builder of small homes, for a study of their predominating features is of value to him in his business as contractor.

The design here illustrated and described was the result of a desire on the part of the owner to have a house patterned after the California style of bungalow but adapted to the climate prevailing in New York State. As many of the bedrooms as possible were to be located on the first floor, so that the climbing of stairs might be reduced to a minimum. These first floor sleeping apartments were to be separated from the general living quarters as much as possible, and the way in which the problem was solved may be gathered from a glance at the floor plans. The two bedrooms and bath are well apart from the living room and kitchen, while the living room, dining room and enclosed porch open into each other in a manner which permits of the free circulation of air typical of the California bungalow, and yet permits of each being shut off from the others should the rigours of winter require. The pergola, placed to receive the warm rays of the sun, forms a pleasant summer addition to the dining room. Two bedrooms and a bath on the second floor complete the layout.

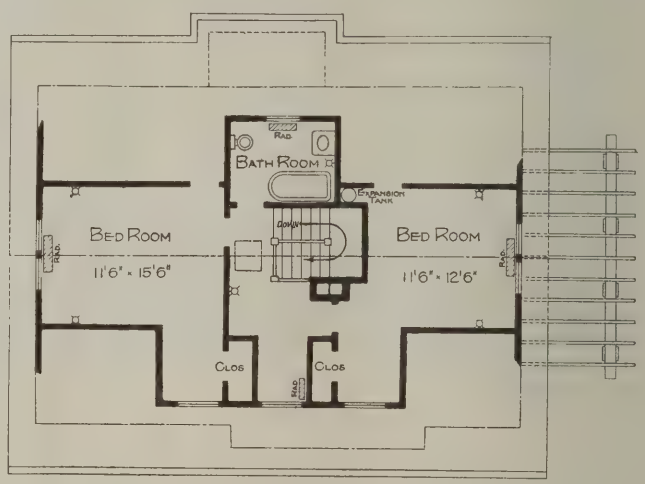
The footings are composed of flat stones extending 4 inches on each side of the foundation wall and stone is also used for the footings under piers.



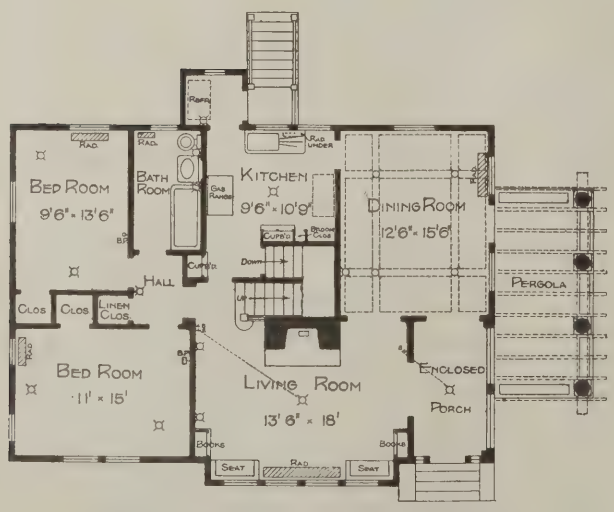
Front Elevation Showing Some of the External Features of Architectural Treatment—Scale 3/32 In. to the Foot



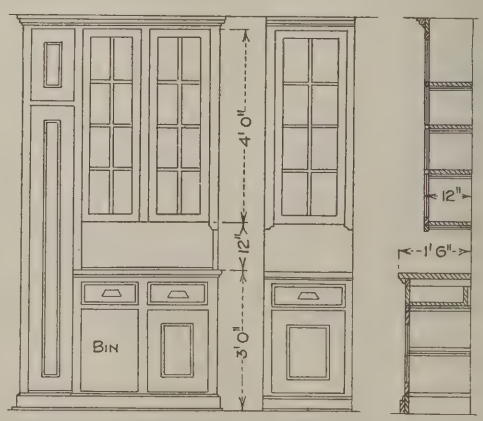
Elevation in Dining Room Showing Paneling, Plate Rail, etc. —Scale ¼ In. to the Foot



Second Floor Plan—Scale 1/16 In. to the Foot



Main Fioor Plan—Scale 1/16 In. to the Foot



Section and Elevations of Kitchen Cupboards —Scale ¼ In. to the Foot

PLANS, ELEVATIONS AND MISCELLANEOUS CONSTRUCTIVE DETAILS

The footing under the rear porch steps is of cement.

The foundation walls and piers are of random rubble, the intersections between the stones being filled with spalls and cement mortar in the proportion of one part Portland cement to three parts sand with no more lime than one-third the amount of cement. The wall joints are pointed with waterproof cement below grade, and above grade with tinted cement mortar.

The cellar floor is of a 1:2:5 concrete mixture, the stone being of a size to pass through a 2-in. ring. Over this is laid a top dressing 1 in. thick, composed of one part cement and two parts sand.

The timber used in the framing is of spruce, the sizes of the various members being as follows: sill 4 x 6 in., first floor joists 2 x 10 in. let into the sill, and second floor joists 2 x 8 in. all spaced 16 in. on center and cross-bridged with 1 x 3 in. bridging



REAR VIEW OF RESIDENCE OF MR. L. D. HUDSON, SHOWING ENTRANCE TO GARAGE

spaced not more than 6 ft. on centers. The rafters are 2 x 6 in. spaced 24 in. on centers, and studs 2 x 4 in. spaced 16 in. on centers. The floor joists are doubled under all parallel partitions and headers and trimmers are also doubled. The beams used for the ceiling of the second floor are 2 x 6 in. also spaced 16 in. on centers.

The main roof and dormers are covered with ⅞ x 2-in. spruce shingle lath spaced 5 in. on centers. The sheathing boards for the side walls are ⅞ x 9-in. tongued and grooved yellow pine. The main and dormer roofs are covered with 18-in. cedar shingles exposed 5 in. to the weather on the main roofs and 4 in. on the dormer roofs, these being given a brush coat of Cabot's shingle stain. Shingles are used for the ridge of the main roof.

The sheathing boards of the main and dormer walls are covered with a layer of Neponset building paper, over which are placed 20 in. white cedar shingles exposed 8 in. to the weather. These shingles were given three coats of white paint.

All exterior trim is of cypress, the painting of which was three coat work.

The rear porch floor is of 1⅛ by 2½-in. Oregon fir laid with a slight pitch. The ceiling is of ⅞ x 4-in. double beaded tongued and grooved North Carolina pine finished at the wall of the building with a ⅞ x 6-in. frieze board and a ⅞-in. cove molding against the ceiling.

The treads of the rear and front porch steps are 1⅛ in. thick and the risers are ⅞ in. thick. The front steps are built between cheeks finished at the top with ⅞ x 8-in. fascia and cove molding. The porch columns are square and have a cap and base.

A lattice is placed on each side of the front windows to the left of the bay and under each of these front windows is a flower box.

Windows are of both the double hung and casement types, the latter being hinged to swing inward. The frames are cypress and the sash white pine.

The front entrance door is of oak 1¾ in. thick and has twelve panes of bevel plate glass. The interior doors are 1⅜ in. thick of Colonial three-panel type, except in the living and dining rooms, where French doors are provided.

The doors and interior trim are of oak and were given one coat of stain, one coat of shellac and one coat of deadlac. Walls and ceilings are plastered with three-coat work.

Entrance to the house is through an enclosed porch which opens directly into the living room. The feature of the latter is the fireplace, which is constructed of selected field stone, the joints being pointed with tinted cement mortar. The hearth is

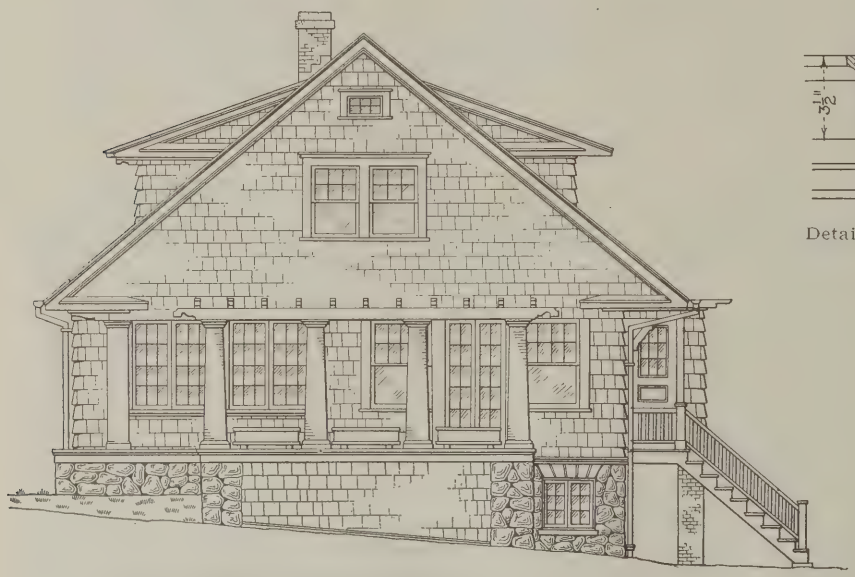
composed of 6 x 6-in. red tile. The flue lining is terra cotta and the flue is 13 x 13 in. An ash pit, provided with iron frame, door and drop, is so placed as to receive the ashes. The fireplace is provided with arch bar and Covert damper. There is also an oak mantel 4½ in. thick. On the opposite side of the fireplace is a large bay window containing two seats divided by a radiator. On each side of this bay is an oak bookcase.

The floors of the living room, enclosed porch and dining room are double and consist of a sub-floor of ⅞ x 9-in. tongued and grooved yellow pine over which was placed a layer of deadening felt which in turn received the finished floor of ⅞ x 2½-in. oak. The completed floor has a border six boards wide and a finish of one coat of paste filler and two coats of Supremis.

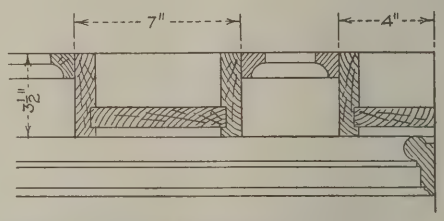
The dining room can be reached either from the living room or from the enclosed porch and opens upon a pergola. The feature of this room is the beam ceiling, which is made of 3½ x 7-in. and 4 x 7-in. material. There is a plate shelf 6 ft. above the floor and it is paneled underneath with ⅞ x 3-in. strips placed about 18 in. apart and there is a ¾-in. ogee mold around the panels.

As can be seen from an examination of the first floor plan and fireplace detail, the stairs open from the small hall which serves to connect the various parts of the house and rise to a landing back of the fireplace, from whence they turn and become visible at the left of the fireplace. The stairs are of oak, the treads and landing being 1⅛ in. thick and the risers ⅞ in. thick. The newels are 5 in. square, the rail is 2½ x 3 in., and the balusters are 1½ in. square, three to a tread.

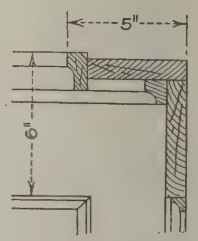
The kitchen can be entered either directly from the dining room or from the stair hall. It contains a gas range which has an oven, warming shelf, hood, vent, etc. The wall back of the range consists of 6 x 6 in. white glazed tile with cove bottom, rounded sides and molded cap, all laid up in white cement. It is 6 ft. high and 4 ft. wide. Metal lath



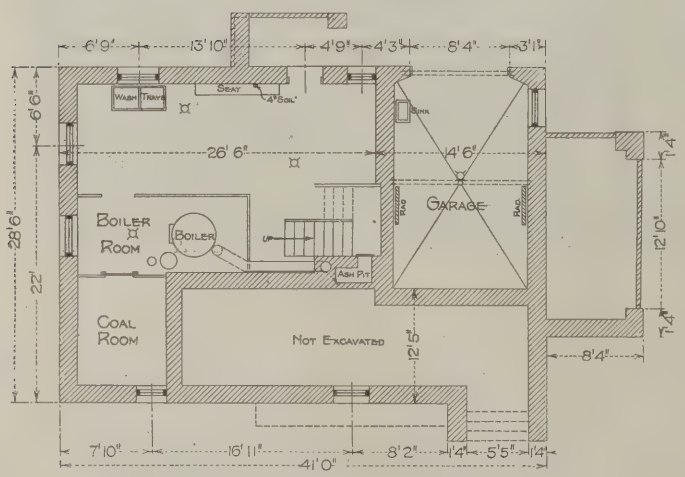
Side (Right) Elevation—Scale 3/32 In. to the Foot



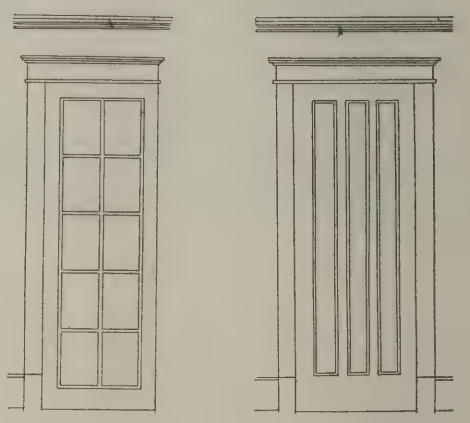
Details of Ceiling Beam—Scale 1½ In. to the Foot



Details of Plate Rail—Scale 1½ In. to the Foot



Foundation Plan Showing Garage—Scale 1/16 In. to the Foot



Typical French Door

Typical Interior Door and Trim

Scale ¼ In. to the Foot



VIEW IN LIVING ROOM, SHOWING MASONRY FIREPLACE AND CHIMNEY BREAST AT THE RIGHT WITH WINDOW SEAT AT THE LEFT

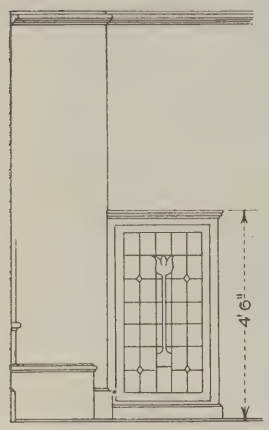


STAIRWAY AND FIREPLACE IN THE LIVING ROOM OF RESIDENCE OF MR. L. D. HUDSON AT PELHAMWOOD, NEW YORK

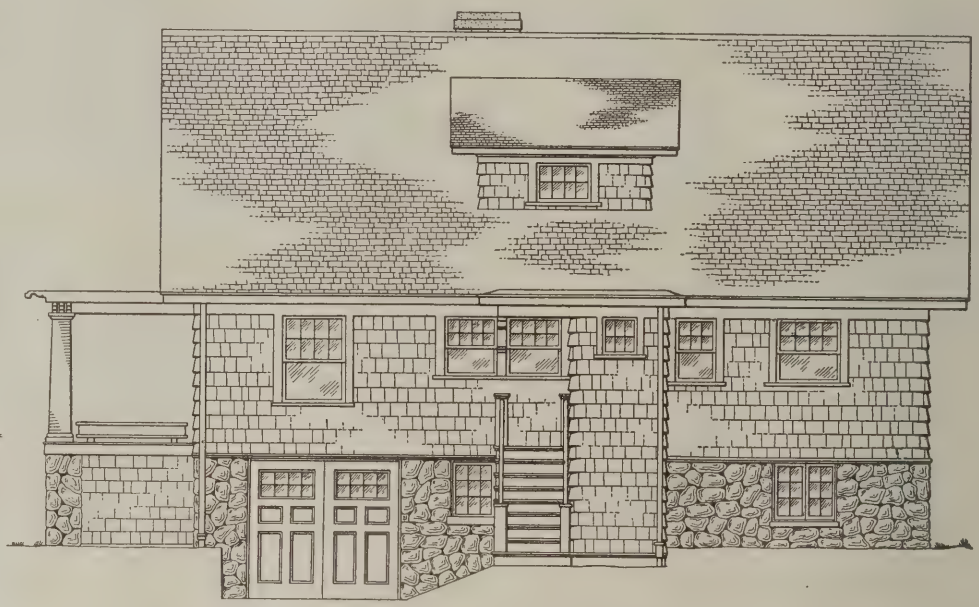
was used back of the tile. A concrete fill was laid between the beams to form the hearth foundation and over this a surface of tinted cement 1 in. thick. The sink is a "standard" porcelain enameled roll rim with integral drain board, back and apron, supported on porcelain enameled adjustable legs. There is a cupboard and a closet. The refrigerator is placed in the entrance porch opening at the left.

lath was used over the side walls to a height of 4½ ft., over which was placed 6 x 6 in. white glazed tile. Above the tile wall, patent plaster of a hard finish was used.

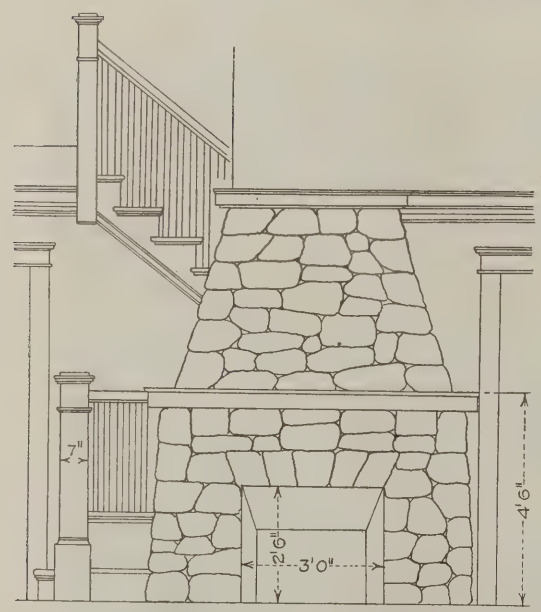
The first story bathroom contains a white steel medicine closet placed in the partition over the wash basin and is 21 in. wide and 27 in. high, being provided with plate glass shelves and a bevel plate mir-

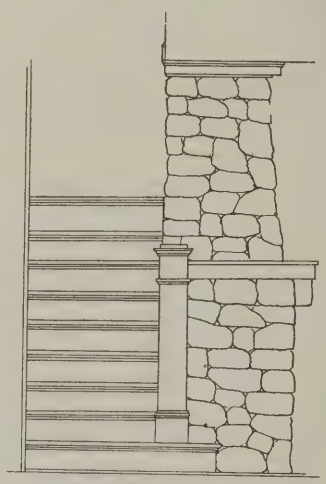


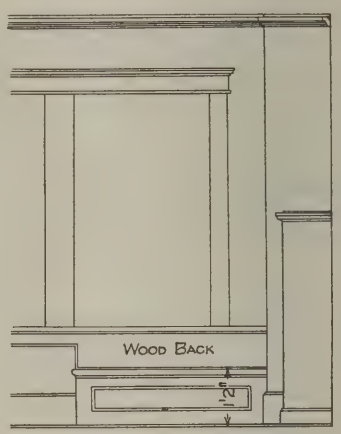
Elevation of Book Case at the Left of the Front Window in the Living Room—Scale ¼ In. to the Foot



Rear Elevation Showing Entrance to Garage—Scale 3/32 In. to the Foot







Front Elevation of Seat and End View of Book Case in Living Room—Scale ¼ In. to the Foot

Front Elevation of Stairs and Stone Fireplace in Living Room—Scale ¼ In. to the Foot

The trim and doors were given one coat of shellac and one coat of varnish.

The floor in the kitchen and the other parts of the house, excepting the baths, are double, like the oak floors just described, but the finish floor is of ⅞ x 2½ in. comb grained tongued and grooved Alabama pine, to which was applied one coat of filler and one coat of Supremis.

There are two bathrooms, the floors being of 1 in. white hexagonal tile laid up in white cement. Metal

ror in the door. The bathroom fixtures are "standard" porcelain enamel.

One of the convenient features of the house is the garage built under the kitchen. This is rendered easily possible because of the location of the dwelling upon a slope. The floor is of 3 in. of concrete of a 1:2:5 mixture. The ceiling consists of a reinforced concrete slab 3 in. thick, a 1:2:4 mixture being used, the stone being of a size to pass through a ½-in. ring. The reinforcement consists

of No. 26 gage "Corr" Mesh laid ribside up, the outer ribs being interlocked, pinched together and the ends lapped 2 in. These ends rest on 6 in. I-beams. Over the top of the slab were placed 2-in. wooden sleepers spaced 16 in. on centers to receive the floor above, the space between the sleepers being filled with cinder concrete. The underside of the slab received a ½-in. plaster coat composed of 5 parts Portland cement, 12 parts sand, 1 part hydrated lime, and long cattle hair. There is an iron sink provided with cold water supply and a faucet with a hose bibb.

The cellar contains a set of two part Alberine stone wash trays supported on iron legs and provided with hot and cold water fixtures and galvanized iron covers.

The building is warmed by means of vapor heat, the boiler being made by the Spencer Heater Co. It is covered with plastic asbestos cement applied in 2 coats to a total thickness of 1½ in., the outer coat being troweled to a smooth even finish.

The house is wired for electric lighting and call bells in accordance with the rules and regulations of the Board of Fire Underwriters.

The house here described is located in Pelhamwood, one of the many attractive suburbs of New York City, and was built for L. D. Hudson in accordance with plans and specifications prepared by Architect W. S. Moore, 30 East 42nd Street, New York City.

The building contractor was Malcolm Johnson, 12 Hillcrest Avenue, New Rochelle, New York.



DINING ROOM IN RESIDENCE OF MR. L. D. HUDSON AT PELHAMWOOD, NEW YORK

SULPHATE OF ZINC FOR WALLS

The sulphate of zinc treatment for concrete walls afterward to be painted has been adopted for the interior wall finish of the permanent hospital building at Panama Canal. The report of George M. Wells, resident engineer of the Building Division, describes these buildings and their interior wall finish as follows:

"A great deal of study was given to the design of these buildings in an effort to decide upon that form of composite construction that would make for economy and yet meet all the rigid requirements demanded by the health department as regards character of interior and exterior finish. It was finally decided to make the veranda and main-building walls of poured reinforced concrete, while the floors with a clear span from wall to wall across the building were to be constructed of reinforced concrete overlaid with terrazzo mosaic tile or some composition flooring for finish. Intermediate walls 6 in. or over in thickness are also to be built of reinforced concrete. Walls less than 6 in. thick are to be laid up of hollow cement blocks plastered with two-coat cement and sand stucco troweled to a smooth dead surface. The concrete walls are to be rubbed and filled to a similar finish.

"The health department demanded that the walls should be both smooth and of sufficient hardness to withstand chipping at corners, cracking or denting, and further that the treatment of the wall finish should be such that the wall could be washed with

antiseptic solutions if necessary, without in any way injuring the finish.

"It is proposed to meet these requirements with the cement walls as described, treated with chemical and painted with special paints as follows: The walls will be first given two coats of a wash of sulphate of zinc, mixed with equal parts by weight of zinc and water. The effect of this wash is to neutralize or destroy the alkalinity of the hydrated lime which comes to the surface of the concrete wall as calcium hydroxide and changes the latter into a mixture of calcium sulphate and zinc oxide. This gives a surface that has no leaching effect on linseed oil. To coats of flat-finish, oil-mixed paint of any color desired will then be applied. On this will be placed as a final finish a third coat of enamel washable wall paint.

"It can be shown that a concrete wall treated in this manner will cost far less per square than the usual three-coat, hard-finish white plaster, sized and tinted to the color desired. The difference in cost between the two methods is estimated to be approximately $12 per 100 sq. ft. in favor of the painted wall with the additional advantage gained of a harder and more durable surface."

A SAFE WAY TO REMOVE SPLINTERS

A simple and safe surgical appliance which is worth trying, if occasion calls for something along that line, is described in a recent issue of *Woodworker*. The writer says that one of the most annoying minor accidents to which every woodworker is subjected at times is to have a sliver of wood stuck in his hand, and its removal is painful if not properly performed. If the splinter is soft wood, it cannot be removed very easily with a needle or other sharp instrument.

A very easy and effective way of removing a splinter without pain or inconvenience is to take a wide-mouthed bottle—such as a milk bottle—filled nearly full of water as hot as the glass will stand. Place the injured part over the mouth of the bottle, pressing down slightly, thus preventing any steam from escaping. This will cause the flesh to be drawn down, and in a minute or so the steam will extract the splinter, at the same time preventing the inflammation which usually follows an injury of this kind.

SOMETHING ABOUT DOUGLAS FIR

Some very interesting particulars concerning Douglas fir, which is also known as Red Fir, Yellow Fir, Oregon Fir, Columbia Pine and Douglas Spruce are presented in a pamphlet lately issued by the Government of British Columbia. It states that this wood is the most important timber tree on the North American Continent or in the world. No other one species exists in such great individual sizes, such excellence of quality and such vastness of quantity over so wide a range. No other one species is so well adapted for such a variety of uses. It is the world's "All Utility" wood.

The tree is found from Northern British Columbia to Mexico, covering a range of over one million square miles, and reaches its best development on the coast of Southern British Columbia. The total quantity of Douglas Fir timber is estimated to be greater than that of all the hardwood timber in North America. With the single exception of the Sequoias of California, it is the world's largest timber tree. The average height is 150 ft. to 255 ft., with a diameter of 3 ft. to 6 ft. Exceptional trees reach over 300 ft. in height and 15 ft. in diameter.

There are only two related species, one in Western America and one in Asia. Both are small, scrubby, and commercially non-important. Douglas Fir timber is produced only in Western North America, and the best of it comes from the Pacific Coast. The wood of Douglas Fir is comparatively light, but very strong; it is the strongest wood in the world for its weight that is obtainable in commercial sizes and quantities. It is moderately hard, but easy to work, straight grained, tough, resilient and durable. It varies in texture and color from a fairly soft, fine-grained straw yellow in narrow-ringed, slow-growth trees, to a harder, coarse-grained reddish brown in fast-growing timber. It takes stain well in any shade or color. It holds nails firmly, is practically impervious to water, and is durable. When sawed tangentally (slash grain) the grain of the wood is shown in a most beautiful figuring, which makes it very attractive and widely used for interior finish of every description.

Douglas Fir is the ideal building and structural timber, because it combines the requisites of great strength, light weight, ease of handling and working, durability, beauty, and cheapness more than any other commercial timber; moreover, on account of the great size of the trees, the timber can be furnished in extraordinarily large dimensions. The wood of Douglas Fir is equally as strong and is much lighter than that of its nearest commercial competitor—Long-leaf Pine, also known as Pitch or Southern Pine. For bridge and mining timber, heavy frame, and strong planking for ship scows, dredges, railway cars, elevators, stave deals, and shores in shipbuilding yards; piles for wharves; spars, etc., it is unsurpassed.

A NEW USE FOR CEMENT

An unique contraband scheme has been uncovered in Malaga, Spain, according to the *St. Louis Post Dispatch*, as will be noted from the following cable to it from Paris:

"A Madrid dispatch to the *Petit Journal* says that 300 blocks of stucco which were shipped from Zurich to a merchant at Malaga, Spain, by way of Genoa, have been found to contain rifles and ammunition. The blocks lay for six weeks on the wharf at Malaga, no one appearing to claim them. Then one of the blocks was broken open and it was discovered that the interior was filled with rifles.

"The authorities thereupon examined the other blocks and found a total of 4000 rifles and 400,000 cartridges."



SOME ASPECTS OF MODERN SHINGLING*

METHOD OF SIDE WALL SHINGLING — VARIOUS DESIGNS OF ORNAMENTAL WORK AND HOW PRODUCED

By Edward H. Crussell

SHINGLES on side walls are usually laid with a greater exposure to the weather than roof shingles, 5 in. to 6 in. being the average, though the width of the courses is often varied for ornamental purposes—a matter which will be considered presently.

Side wall shingling can be done by the gage and hatchet method, but guide lines should be used more frequently than on roof work, especially for the first 6 or 7 ft., or until the work gets above the line of observation. Wall shingling cannot be done quite so rapidly as roof work, chiefly because the shingles cannot be placed so conveniently. Many different schemes have been tried for the elimination of the continued stooping after shingles, but the best method is to let the bundle lay flat on the ground or scaffold after breaking it open, and pick up the singles with the hatchet, the front corner of which is ground sharp and thin for that purpose.

The shingles are gaged from the course below in the same manner as for roof shingling, excepting that for the gageing the hatchet is held back-handed as in Fig. 47. Holding the shingle with the hatchet, and the method of nailing are exactly the same as explained for roof shingling.

In the best work it is considered proper to arrange the courses of shingles so that they come even with the tops and bottoms of the windows and with the heads of the doors. The windows on modern dwellings, however, often dodge up and down to such an extent and are of so many different sizes that it is sometimes difficult to get the spacing just right to catch all of them; and the writer knows of builders who side-step all this trouble, by disregarding the openings entirely and running an unvarying width of course from the sill to the plate. Many mechanics will condemn this method, but the "man in the street" never seems to notice the difference.

Where it is required to space the courses for the openings, the easiest way is to set out the correct spacing on a rod and use it for testing the different wall spaces. With the rod the necessary calculation can easily be made; stand it beside the opening and note where the regular spacing will bring you; suppose the line shows 2 in. above the window head, then shorten each of eight courses below it one-fourth of an inch. If you think one-fourth of an inch too much variation, then shorten sixteen courses one-eighth of an inch. If the line shows *below* the window head less than half the width of a course, increase the width of the courses.

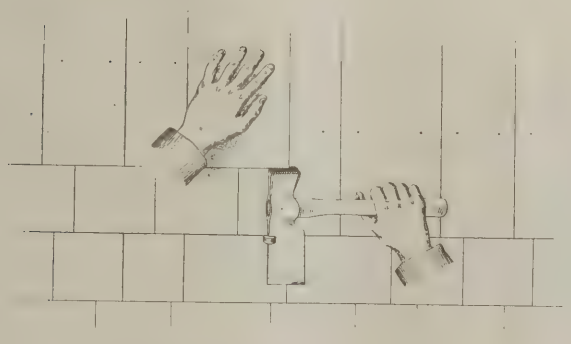


Fig. 47—Shingling on Side Walls

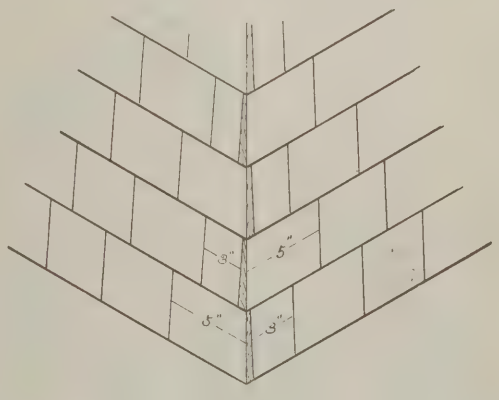


Fig. 48—Shingling a Corner

*Copyrighted 1916 by Edward H. Crussell.

On the corners the joints should be broken, as already explained in the chapter on hips, and it makes a neater finish to have the corner shingles regular in size—say 5 in. on one side and 3 in. on the other, alternating the order for each course, as shown in Fig. 48.

Of late years some attempt has been made to work ornamental features into the wall shingling, the most common form of which is a variation in the width of the courses, as shown in Figs. 49 and 50. Fig. 50 is a "close-up" view of the corner of the house pictured in Fig. 49 and shows an alternate wide and narrow course. Other arrangements, such as one wide and two narrow, are often employed.



Fig. 49—Shingling with Courses of Different Widths



Fig. 50—A "Close-Up" View of Fig. 49



Fig. 51—A Good Example, Showing Appearance of Shingling Around Curved Openings

A rather perplexing item sometimes encountered is the shingling around semicircular or segmental openings. The best method of handling this problem is very clearly shown in Fig. 51. A scale drawing of the finished opening should be provided before the work is attempted, or if that is impossible

let the workman make a rough sketch so that he will know just exactly what he intends to do. It is much easier to see where the finished work might be improved by some minor changes than it is to visualize that same finished work on the blank wall surface.

Dimension shingles with ornamental butts do not seem to be used as much as formerly. They may be obtained in octagon, circle, scallop or cove, diamond, segment, hexagon and square butts, as shown in Fig. 25. Besides these, other forms may be easily devised for special purposes, Fig. 53 showing a design made with specially cut shingles of two different forms. A study of Fig. 53 will show how designs of a similar nature may be easily devised.

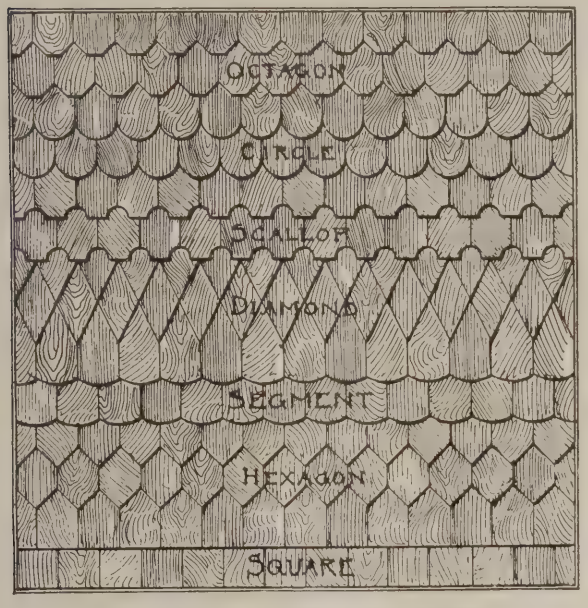


Fig. 52—Various Styles of Ornament

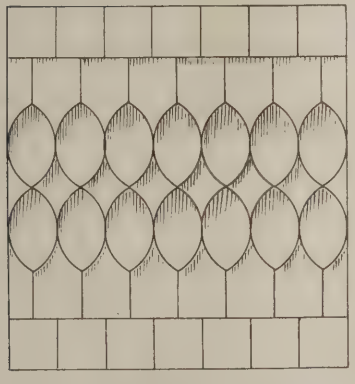


Fig. 53—An Example of Ornamental Shingling

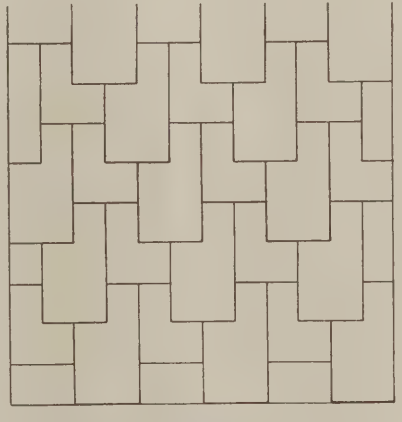


Fig. 54—Design Formed with Square Butts

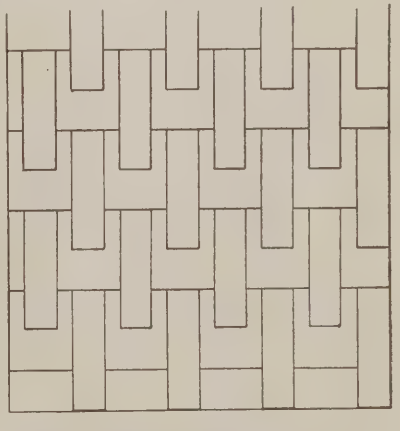


Fig. 55—Another Design Which May Be Formed with Square Butts

Much of the ornamental shingling is used for the decoration of gables, and for this purpose some neat effects may be obtained by the judicious arrangement of shingles with square butts. Figs. 54 and 55 show two different examples. By an interchange of the ideas contained in these two figures several other designs may be evolved, as a study of them will prove.

(To be continued)

MISTAKES MADE IN HOUSE BUILDING

Since we have begun to live in our new home we have found that there are several misplaced rooms and some other features which are decidedly inconvenient, writes Grace C. Rutter in the *New York Tribune*. We have a neat cottage of modern style, but a casual survey gives no idea of the inconvenience and actual discomfort we are occasioned because we followed a system of false economy in the original plan.

It was false economy, because to have built in the first place as experience has shown us we should have built would have cost considerably less than to tear out now and rebuild. In addition to the money involved there would be the risk to furniture and the bother of moving it, and the discomfort of living in a house during rebuilding.

It is impossible to know how one will want everything arranged until one is actually living in the house, but one is sure of needing heat for winter and convenient placing of kitchen and laundry, and plenty of closet room.

Our heater is of the hot-water style, which has been proved to be just the thing for small homes—if properly installed. Unfortunately, our heater is too small and here begins our troubles.

We had the services of a plumber who was nearly as inexperienced in computing the amount of boiler capacity required to the square inch of air space as we were in house building.

Economize, if you must, in furniture or dishes, but do not practise this homely virtue in your heating arrangements. A plumber of experience will charge you more, but he can estimate correctly, and, if you are willing to shovel in the coal, you will be sure of a warm house.

We have a radiator in each one of the colder bedrooms, leaving communicating doors open to warm the other two rooms. Except in the coldest weather, this results in as high a temperature as people usually care for in sleeping rooms. Where bedrooms are to be occupied by old persons or little children they would need to be warmer.

Our plumber did right in so placing the radiators in each room that they would require the shortest possible lengths of pipe to connect with the boiler in the cellar.

This makes what is termed "short circulation," where as little heat as possible is wasted in the pipes. The best arrangement, when it is possible, is for radiators to be placed in the coldest corner in a room or against an outside wall and still make a short-length connection. This can rarely be done, however, as boilers are usually placed nearly under the center of a house. Where the cellar is partitioned into several rooms the heater should be put in the coldest part of the cellar.

No one should be as foolish as we were and build the cellar too small and under only the warmest side of the house. When the heater is under the coldest part of the house it assures a better draft, and, for the same reason, the chimney is better placed on this side.

If you have an undersized boiler and a shortage of radiators, as we have, you can keep fairly comfortable until the coldest days come; then you must run the heater full blast day and night and live only in the warmer side of the house.

But the most serious fault in the arrangement of rooms is our misplaced laundry, which is built in combination with a summer kitchen in an inclosed back porch. During summer it is an ideal arrangement, but in winter it is very cold for washing. If we but had another room in our cellar we would move the stationary tubs and other laundry equipment into this warm place.

An arrangement which we did not make for economy was the placing of the bathroom. It is in the upper hall, on the cold side of the house, where we thought it would be most convenient to all the bedrooms. We now find that we would be less inconvenienced if it were on any other side of the house where the pipes would not be liable to freeze (as they have done several times), depriving us of toilet comfort when most needed.

One old-fashioned plan we used in the stairways. We placed them side by side, one opening into the hall and the other into the dining room. Had we placed the front stairway a few feet farther front and the rear one opening into the kitchen and running across the back of the hall, both could have ascended to a joint landing in the upper hall. The space which the staircase now occupies in the dining room would give us several extra feet, which would be very welcome there, and the waste spaces under the two stairways, if placed this other way, could be combined in a much-needed closet. In our bedrooms there are either too many windows or they are in the wrong places. In some bedrooms it is quite a task to find a position for the bed except across a window or too near one. One is apt to forget to provide wall space for large pieces of furniture and to think more of providing enough light.

The waste product of saw mills in the United States including that conveyed to the furnaces as fuel is estimated by the Forest Service of the U. S. Department of Agriculture to be 36,000,000 cords per year and the equivalent of 2,880,000,000 cu. ft. of solid wood substance.

THE COMPLETE BUILDING EXPOSITION IN NEW YORK CITY

One feature of the National Complete Building Exposition that will appeal peculiarly to the average building contractor will be the special divisions illustrating the very latest development in commercial, factory, church and theater construction. In expanding the educational policy of the exposition it is planned to make these special exhibits as complete and comprehensive as possible, while in no degree minimizing the home-building interest which is really the fundamental idea of the show.

Much interest will attach also to the community exhibits to be put on by the several associations promoting the welfare of asbestos, tile, metal and slate shingles, hollow and self-facing tile, metal lath, cement, concrete, terra cotta, gypsum and vitrified clay products. These will be unusually elaborate and will show most effectively the possibilities of each particular material.

The exposition will be held in the Grand Central Palace, New York City, March 5 to 11, 1917, and will provide many interesting pointers for the enterprising and up-to-date contractor.

ARCHITECTS TO FURNISH PLANS FOR PLUMBERS

For several years past the relations between the various building trades in the city of Louisville and the contracting plumbers have not been all that might be desired and with a view to improving these relations the Master Plumbers' Association of the city appointed a committee to confer with architects, builders, general contractors, etc., and to report to the association. Several reports were submitted and finally the association at a meeting a short time ago unanimously adopted rules and regulations which were printed and distributed among those in the city likely to be interested.

The principal clause of the rules and regulations is that concerning the matter of furnishing plumbers with a copy of the blue prints, specifications, etc., so that the plumber can work out his bid in the privacy of his own office on big jobs which are awarded through architects' or general contractors' offices. The old system of halfway looking through plans with a dozen other men was not at all satisfactory.

A THOUSAND FEET OF LUMBER

The following letter received by a lumber company in the West and published in the Chicago *Tribune*, is likely to draw a smile to the reader:

Dear Gentlemen: In your letter to me quoting prices on lumber, let me know what you mean by M feet of lumber. Does that mean one mile of lumber? And do you lay it out and measure how much is it a mile of lumber? You know the place I want to build should not reach a mile, but should be only a little house for chickens. Be sure to let me know right away how much is it an mile of lumber. Yours very respectable, TIM ———, Ottumwa, Ia.

The demand for building materials in Sandusky, Ohio, is said to be greater than any time before in a number of years. Dwellings and factories are going up in unusually large numbers.

EFFICIENCY OF TYPES OF FARM BARNS

MUCH DEPENDS ON CLIMATIC REQUIREMENTS, AS WELL AS UPON PRICES OF LABOR AND MATERIALS

AMONG the many interesting reports presented at one of the meetings of the American Society of Agricultural Engineers was that of the sub-committee on Major Farm Structures, and dealing more particularly with the efficiency of various types of farm barn construction. According to this committee the most efficient type depends to a large extent on climatic requirements, current local prices of building materials, labor conditions, transportation and how permanent the buildings are to be. In the southern states a structure for live stock is better without glass in the openings for light, while in the northern states glass is absolutely necessary at least during certain months of the year.

THE TWO TYPES

It is therefore necessary to divide the construction into two types; one for the northern and one for southern conditions. This again may be divided into several types to suit the local material and labor conditions.

For rectangular barns the arrangement of two rows of stalls running lengthwise of the barn has been found most desirable because the side walls paralleling each row furnish better light. Such an arrangement is a saving of labor because two rows can be attended to at once in caring for the stock.

The side walls of a building containing live stock must be substantial and permanent and so constructed that large openings can be had for doors and windows without materially weakening them; also they must contain vertical ducts for ventilating flues.

WINDOW OPENINGS

The window openings and ventilating flues are as important as the walls themselves. The live stock can live without walls but not without light and air. The area of window and flue space required in proportion to the area of side wall will depend upon the area of side wall and the number and kind of stock to be housed.

Let us therefore consider the window requirements for this arrangement. Dairy cows placed in rows take up an average stall width of 3½ ft. per head and for each cow at least 4 sq. ft. of window glass surface should be allowed. Therefore, each 3½ ft. of wall length should contain 4 sq. ft. of window glass, which makes an average of 1 1/7 sq. ft. of glass per foot of wall length. The windows should be of such height that they can be spaced far enough apart to admit the required materials to give strength to the walls and also to allow ample space for ventilating flues.

The flues should run in a vertical position in order to perform their functions and should terminate at certain locations in the room running as directly to these points as the arrangement of the room will permit. In order to keep the room free from unnecessary obstructions it has become general practice to build these flues into the side walls where they will be out of the way.

COST OF TYPES COMPARED

There is no question but what concrete, tile, brick and steel will always be the most permanent, and in the long run the most efficient materials to use for the construction of farm buildings. The farmer, however, who is forced to buy cheap land cannot be persuaded to consider concrete or tile as long as the cost of wood construction will keep down the cost of his necessary farm improvements.

For the purpose of determining the cheapest form of construction the following types with estimates of their costs have been compiled, all based on one given market price for materials and a uniform cost for labor. The estimates may be too high for one locality and too low for another, but the same proportion of cost would remain the same for the various types of construction. Comparing the cost and efficiency of three types of frame building we find that the plank frame type of the two-story construction costs about $324 per bent of 12 ft. length, which is equal to $27 per running foot.

The braced rafter type of the two-story construction figures $24 per foot. The one-story construction costs $15 for the stock shed and $6 for the hay shed, making a total cost of $21 complete—a saving of 12 per cent on the braced rafter construction and 22 per cent on the plank truss construction.

Considering the efficiency of the one-story barn from the point of labor, the hay being stored on the same ground level of the stock, there is a saving of labor in filling the mow because the hay track is 10 ft. nearer the ground, this resulting in a saving of about 30 per cent of the hoisting of hay to the rack.

THE ONE STORY BARN

From a sanitary point of view, the one-story barn is much better because there is less danger of contaminating the hay and feed supply if stored in an adjacent shed than if stored directly over the stock, no matter how well the mow floor is built.

More dust is excluded by eliminating the chute, and less odors from the stock will reach the hay.

The risk of fire is lessened because flames and heat from the burning hay shed will not reach the stock as quickly, thus giving more time to drive the stock to safety.

The risk of storm is less because the stock is not in a low building and the hay barn does not extend so high in the air.

The hay shed built to the north of the stock barn

and at right angles to it, forming an "L," gives protection from north winds for the stock barn and exercising lot.

By the proper use of air spaces and building paper the one-story barn can be made just as warm as the barn with the hay above the stock.

The one-story barn will admit making the ceiling higher in the center so that air can be taken out at the highest point in the summer. The higher ceiling also gives more cubic feet of air in the barn per animal.

The committee recommended in its report the following dimensions in connection with barn construction:

Minimum width of barn 32 ft., width of stalls from 3 ft. 4 in., to 4 ft., according to the size of cows.
Cows headed in: Minimum width of central feed alley 6 ft.
Width of mangers, minimum 24 in., maximum 40 in.
Length of stall from stanchion to gutter, minimum 4 ft. 6 in., maximum 5 ft.
Width of gutter, minimum 18 in., maximum 24 in.
Width of litter alley, minimum 3 ft. 6 in.
Cows headed out: Width of feed alley, minimum 3 ft.
Mangers, minimum 26 in., maximum 40 in.
Length of stall from stanchions to gutter, minimum 4 ft. 6 in., maximum 5 ft.
Width of gutter, minimum 18 in., maximum 24 in.
Width of central litter alley, minimum 7 ft.
Thickness of concrete floor, minimum 6 in.

Where the cows are headed in, the central feed alley may be raised to the top of the manger or made level with the stall floor as desired. The stall floor should slope to the rear not less than ¼ in. per foot. It is an advantage to construct the stall floor on a bias varying from 4 ft. 6 in. to 5 ft. 2 in. in width. This will make it possible to place a cow in a stall according to her length. A slight depression in the floor of ¾ in. to 1 in., about 14 in. from the manger curve, will aid in retaining the bedding under the animal's front feet and will prevent them from falling in reaching for food.

The feed alley should have a slight slope toward the point selected for the drain. The surface, if made of concrete, should be troweled as smooth as possible. A smooth feed alley with no corners to hold food prevents them from becoming sour. The gutter should slope crosswise toward the litter alley, to give better drainage and lengthwise toward a drain connected with the manure pit, to be used principally for flushing and washing the floors.

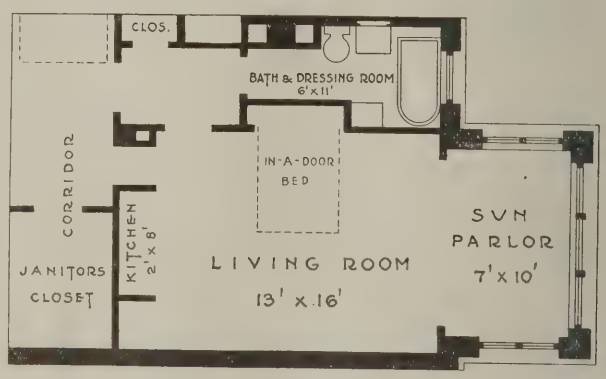
PROTECTION OF SEPTIC TANK OUTLET FROM FROST

A question which frequently comes up to those who are providing septic tanks to dispose of the waste from their buildings is the means of protecting the distributing lines from frost. As a rule, these pipe lines are so laid that there can be leakage of the effluent from the tank at the joints all along the line. In Bulletin No. 14 of the Iowa State College an illustration is given showing the arrangement of sand filters where the piping, 4 in. in diameter, is laid in a trench 8½ in. deep and 11½ in. wide, filled in with coarse stone, then covered over with sand to a depth of 2 ft. 6 in. to the center of the drain pipe. The covering is sand, and at the end of the distributing pipe a 4-in. riser comes above the ground. These pipes are laid about 5 ft. on centers, and the bed, before the sand filling is put in, is dug out so as to form a ridge between two different lines.

The Bulletin states that in order to prevent the freezing of the sewage on the surface and sealing the filters, rendering them inoperative, the filter beds are usually ridged for cold weather operation so that when the beds are dosed the sewage flows in gutters formed between the ridges. If freezing takes place, the ice formed on the top of the sewage remains suspended on the ridges, and the succeeding doses of sewage will flow underneath the ice. The ridges should be thrown up every 3 or 4 ft., and not be any higher than necessary to prevent freezing at the surface of the bed. At the close of the cold period the valleys between the ridges may be freed from all deposit or scum before leveling down to the ridges for warm-weather operation. All dirty sand should be removed at this time. This method, used in Iowa, will be of interest to men who have to arrange septic-tank systems in all parts of the country.

CHICAGO'S ONE-ROOM APARTMENTS

The one-room apartment seems to have received the decided approval of the Chicago apartment dweller, for within the short time that has elapsed since its introduction into that city a number have been built, much thought and time having been devoted to secure an economical division of space. The entrance door of one of these apartments opens into a small vestibule, which contains a closet. Directly in front of the entrance door is the bathroom, 6 x 11 ft., containing a built-in dressing table and linen case, so that it can be used as a dressing room. At right angles to the entrance door is the living room,



FLOOR PLAN OF ONE-ROOM APARTMENT

13 x 16 ft. This contains a kitchenette, 2 x 8 ft., built into the wall and including a gas stove, ice chest and sink, all of which are concealed by curtains. A built-in bed is placed against the bathroom partition, and when not in use it is shut in by French doors and mirrors. A sun parlor or balcony, 7 x 10 ft., is semi-divided from the living room. The type of one-room apartment herein described was designed by Roy F. France.

"KINKS" FOR THE BUILDING MECHANIC

SOME "SHORT CUTS" AND "WRINKLES" WHICH THE PRACTICAL MAN WILL FIND VALUABLE

By W. S. Wilkin

THE suggestions which are here presented relate to various matters which the carpenter and the builder often find useful in their work. Referring to the diagrams, Figs. 1 and 2 illustrate a practical method for drawing the arc of a circle without a center. Sometimes in making a new street in his town the carpenter is called upon to construct a "form" for the crown of the thoroughfare. I have seen used boards 16 ft. or 18 ft. long with only a few inches crown, and it would take a long radius to lay it off with a rod and trammel points. In fact, it would be necessary to have lots of room, to say nothing of a rod 30 ft. or 40 ft. long. By using the method here shown it can be laid off on the bench.

Referring to Fig. 1, lay off the chord on the edge of the board, as from *c* to 7, then square across the board at each end, as at 7-*f* and *c*-*e*;

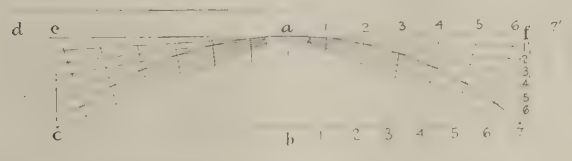


Fig. 1—Method of Drawing an Arc When the Radius Is Too Long to Permit of Ordinary Methods

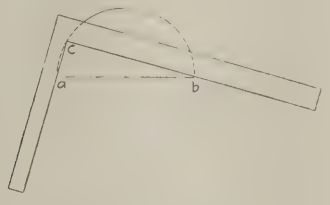


Fig. 3—Method of Drawing a Small Circle by Means of the Steel Square

also in the center *b*-*a*, and mark the height of the segment at *a*. Draw a line from *a* to 7 and from *a* to *c*. Then draw the line 7-7′ perpendicular to *a*-7, and *c*-*d* perpendicular to *a*-*c*. Now draw the line *d*-7′ passing through *a*. Divide *b*-7 into any number of equal spaces, in this case seven; then divide *b*-*c*, *c*-*e*, *d*-*a*, *a*-7′ and 7-*f* into the same number of equal spaces as shown.

Now draw 1-1, 2-2, 3-3, etc.; also *a*-1′, *a*-2′, *a*-3′, etc. Drive a nail at the intersection of 1-1, with *a*-1′; also at the intersection of 2-2 with *a*-2′, etc. Bend a thin strip around the nails and mark around this with a pencil and the result is a curve that is almost, if not quite, a perfect arc of a circle.

There are several other ways of doing this, and one is shown in Fig. 2 which I think is very good. Square across the center of the board and make the height of the segment at *c*; then lay off the length of the chord on the edge of the board, as at *a*-*b*. Now with *d* as center and *d*-*c* as radius draw the arc *c*-*e*. Divide *d*-*e* into any number of equal spaces—in this case seven; then divide the curves *c*-*e* into the same number of spaces and draw the lines 1-1, 2-2, etc. Divide *d*-*b* and *d*-*a* into the same number of equal spaces and draw the line 1′-1′ parallel to the line 1-1; the line 2′-2′ parallel to 2-2, etc., both ways from the center as shown.

Make the line 1′-1′ the same length as 1-1, and the line 2′-2′ the same length as 2-2, etc., as shown. This may be done by taking the rule and pencil and using them as the marking gage which

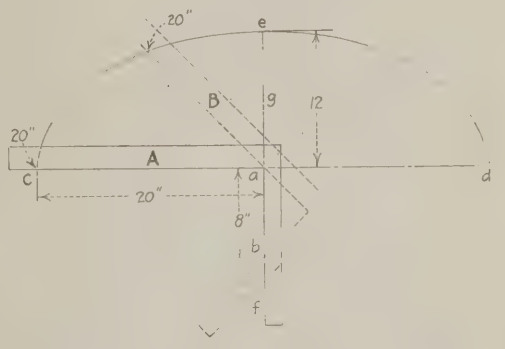


Fig. 4—Method of Drawing An Ellipse by Means of the Steel Square

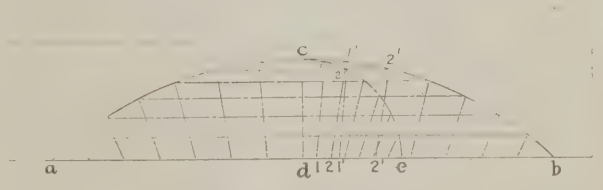


Fig. 2—Another Method of Drawing Large Arcs

every carpenter knows how to do; then stick the nails and draw the curve as in Fig. 1.

In Fig. 3 is shown the method of drawing a small circle with a steel square. Let *a*-*b* represent the required diameter. Drive a nail at *a* and also at *b*; hold the pencil at *c* and with the square close against the nails slide it around and *c* will trace the curve; reverse the square and draw the other half.

Fig. 4 shows how an ellipse may be drawn with the steel square. Suppose we desire to draw an ellipse with a major axis of 40 in. and a minor axis of 24 in. We would proceed as follows: Lay off the major axis *c*-*d* and the minor axis *e*-*f*. Drive a nail at *a* and then another nail at *b*, which is 8 in. below *a*, making *b*-*e* equal to *c*-*a*. Place the square as shown by "*A*" and hold the pencil point at the 20-in. mark on the inside edge of the blade; move the square around, keeping the blade

and tongue against the nails, as shown in its position as indicated by *"B"* until the 20-in. mark is at *c* and the blade rests against the nails. Reverse the square and draw the other quarter, then pull out the nail at *b* and drive at *g*, making *g-f* equal to *c-a*. Draw the lower half in the same manner.

In Fig. 5 we show another way of drawing an ellipse which often will be found handy. It is not exactly a true ellipse, but it makes a very pretty curve and for some things I like it better than a true ellipse. Make *a-b* and *d-c* equal in length to the major axis, and *a-d* and *b-c* equal in length to the minor axis. Divide *e-b* into any number of equal spaces and number them as shown. Divide *b-f* into the same number of spaces and number all as clearly indicated. Then draw a straight line

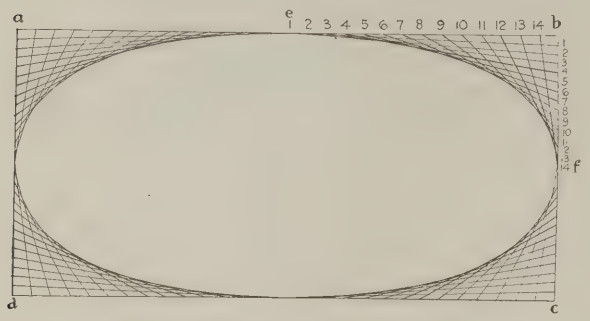


Fig. 5—Another Useful Method of Drawing an Ellipse

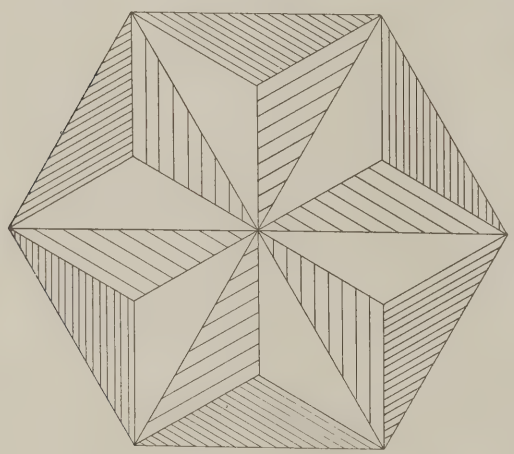


Fig. 6—Pattern for a Table Top

from 1 to 1, from 2 to 2, from 3 to 3, etc., repeating the operation for the other three quarters. The closer the divisions the better will be the curve produced.

We show in Fig. 6 a pattern for a piece of furniture such as a taboret top or something of a similar nature. Several years ago a boy came to me in the shop with a pattern like this and wanted to use three kinds of wood for it. One was white pine, and I do not recall the other two; however, black walnut and mahogany would serve an excellent purpose. He wanted to know how to find the bevels and cut it so as to make a good job. This is the way I did the work.

When I am engaged in the shop I usually have on hand a nice smooth board, something like that shown in Fig. 7, with one edge jointed straight. With the marking gage I ran a line about ¼ in. back from the straight edge, as shown at *a* and *b*. I used this to set the dividers or compasses in as it is practically impossible to set them right on the edge of the board. I took the square and squared across the board as at *c-g* of Fig. 8; then with *c* as center and any radius I drew the arc *e-i-h*. Next with *e* as center and the same radius I cut the arc at *i*, and then drew a line from *c* to *i*. The angle *h-c-i* is just 30 deg., which is the angle required to cut the pieces.

Set the T-bevel with the stock along the straight edge of the board from *c* to *h* and the blade on the line *c-i*. Cut the pieces shown in Fig. 8 and joint the edge *a-b* straight. Then apply the bevel with stock along the straight edge and the blade across the board at *c-d*. Mark along the edge of the blade with the point of a knife. The miter box will probably not cut this angle without putting in a form. Cut off a board at 45 deg. and clamp it in the box, then put in the piece with the straight edge against the 45 deg. cut and set the edge of the saw in the knife mark *c-d*. Now cut one end of all the pieces, then turn them over end for end

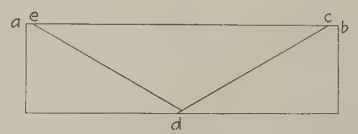


Fig. 7—Board for Use in Patterns Like That Shown in Fig. 6

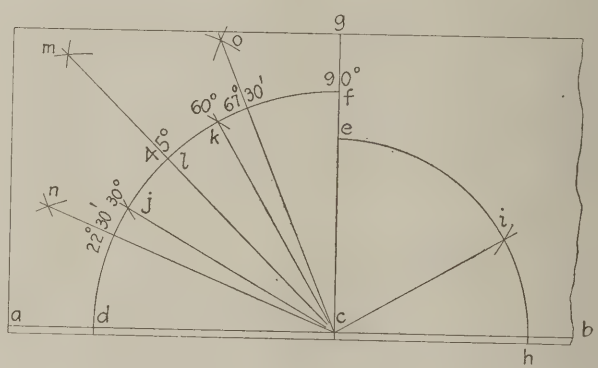


Fig. 8—Diagram of How to Find Some Common Angles

keeping the straight edge against the board and obtain the length *e-c*. Set a stop and cut them all on that end. This will gage the width in the center of the piece.

The boy cut the pieces this way, and did not touch them with a plane, obtaining a fine fit.

The way to put this kind of work together is to glue them on a piece of paper face down and let them dry; then glue them on a board, paper side up, clamp them down until dry; scrape off the paper and then smooth off the pieces.

On the left end of the board, Fig. 8, I show how to find some of the angles commonly used. With *c* as center and any radius draw the arc *d-f*; then with the same radius and *f* as center cut the arc at *j*; this is 30 deg. from *d* as shown. With the same radius and with *d* as center cut the

arc at *k*, which is 60 deg. from *d*. Now with *f* as center and any radius draw an arc at *m*. Again with the same radius and *d* as center draw another arc intersecting the first one at *m*. Draw a line from *c* to the intersection of the arcs at *m*, and this will be 45 deg.

Now with any radius and *d* and *l* as centers draw arcs intersecting at *n*. Draw a line from *c* to *n* and it will be 22 deg. 30 min. from *d*. Again with any radius and *f* and *l* as centers draw arcs intersecting at *o*. Draw a line from *c* to *o*, which will be just 67 deg. 30 min. from *d*. In this way angles that are very accurate can be found in a very few minutes.

SUGGESTIONS FOR PAINTING STUCCO HOUSES

SUGGESTIONS WHICH WILL BE FOUND OF VALUE TO THE BUILDER OF HOUSES OF THIS KIND

GRAY and pea-green is a color scheme for plaster houses which seems to be meeting with much favor at the present day. The houses, with their casement windows and long-stretched English lines, their excellent solution of the piazza problem and their artistic use of plaster, also have a distinct color appeal. One recently noticed has exactly the same color scheme as that of the small shingled house except that its door is pea green and it has an additional touch of pea green in its window boxes. A happy touch of ecru is introduced in its novelty net curtains, hung in straight lines.

Another plaster house is of dull yellow plaster, with a black roof and grayish black shutters. Its walks are of narrow red bricks and its curtains of corn-colored silk. Still another plaster house is natural gray, with the half-timbered woodwork and also the gateway hood of grayish black. The walls and piers are of brick. The touch of red introduced in this way is like a note of genius.

THE PERSONALITY OF THE ARCHITECT

A well-known American architect has a house of creamy white plaster, with grayish black eaves and structural timbers, white sashes and blue window casings, doors and blinds; and that strange blue is said to be the very mark of his genius, the touch that expresses his personality.

These various color schemes are mentioned because we are building more and more of plaster and some of us do not live near the work of the best architects, says a writer in *The Dutch Boy Painter*. The way to study the painting of houses is to get your knowledge at first hand from the work of the best men. There are few ways that we can so directly show practical appreciation of art and of civics combined as by properly painting our houses.

MISTAKES OF THE SMALL HOUSE

The small house of different materials for the first and second floors makes many mistakes in color. If the first floor is of red brick and the second of shingles, brown would be a restful color for the shingles. If the first floor is of clapboards and the second of shingles, white clapboards for the first floor and dark green shingles for the second floor and roof are good. All the first-floor trim should be in white and all the second-floor trim except the sashes should be of dark green. If the first floor is plaster and the second floor shingles, gray for both, with trim of light bluish green, would be attractive.

Do not paint clapboards red. Do not use one color for clapboards, another for shingles, a third for trim, a fourth for roof and a fifth for chimney. Many houses are painted that way, and one may even see two different colors for the first and second floor parts of the chimney, with another color introduced on the window boxes. And the people who live in such houses are not ignorant people; they are very often well educated, well dressed, and well meaning. They have never looked at the color of their houses as an ethical or aesthetic problem.

RESPECT FOR WELL-PAINTED HOUSES

"Painting the house" seems a commonplace affair, but if we can do it uncommonly well, we shall learn to feel for it the respect we pay to so-called higher forms of art. We make too great a distinction between the fine and useful arts. The true art is that which is born from an enthusiasm for beauty and that, like charity itself, gives its best to the needs of our every-day life.

TALLEST OFFICE BUILDING IN BROOKLYN

Since our last issue went to press plans have been filed for a twenty-two story store and office building to be erected on the site of the old Dime Savings Bank Building at the southwest corner of Court and Remsen Streets, Brooklyn, New York, and which sets a new standard of height for office structures in that city. According to the plans which have been prepared by Architects Starrett & Van Vleck, the exterior will be of limestone and granite for the first four stories above which the facade will be of face brick trimmed with limestone. The roof will be of red tile. The cost is estimated to be in the neighborhood of $500,000.

As indicating the wide circulation of the BUILDING AGE and its value as an advertising medium, it is interesting to note an inquiry which was received by the Arkansas Soft Pine Bureau, Little Rock, Ark., from a concern in Camperdown, Sydney, New South Wales, referring to its page announcement in the July number of the paper.

SOME TRICKS OF THE BUILDERS' TRADE

CONSTRUCTION UNDER PORCHES—STORING AND HANDLING TRIM WHEN PLASTERING—THE CELLAR STAIRS

By James F. Hobart

FOR fifty years I have in my leisure time been looking around for new kinks and methods, and the number I have seen would, if all were stacked up together, prove most amazing. I like to take little trips among the new houses in process of erection and note how many new things I can find—new to me at least. Only a short time ago I took such a trip and went into six new houses, finding ten new things which interested me.

ARRANGEMENT OF THE STUDS

In the first house visited the partitions were set ready for the lathers, and the manner in which one closet was studded brought to mind the question, "Why do some walls crack?" After looking at the partition a second time the thought came to me, "Why do not more partitions crack?" In Fig. 1 is shown the manner in which this partition was erected, and it surely was "hung from nothing and stood on a thin floor." The studding which formed part of a closet wall shown at *F*, *G* and *H* were set at the bottom upon two pieces of 2 x 4-in. stuff, which pieces were simply toe-nailed between two of the floor beams. At least studs *F* and *G* were thus set, while the double stud *H* was placed upon a piece of 2 x 4, which was laid on top of the floor joists instead of being cut in between them. This was well enough so far as the stud *H* was concerned, and the lath and plaster of the wall also stiffened this particular stud. The studs *G* and *H* were mounted upon a couple of spring boards, while at the top they were fastened to nothing at all. True, they were nailed to a piece of board shown at *D*, this board being nailed on its edge and, at either end, to a floor joist and to strips *D* and *E* respectively. These strips were only 2 x 2 in. (really only 1½ x 1½ in. actual measurement), and while the board *A* was supported upon both edges by the strip *E*, the other end attached to strip *D* had nothing whatever to support itself and the board at the line of the studs save the stiffness of board *A* and strip *D*. As the board was split the way of the grain little support could be expected for studs *F* and *G*, which were practically free to "go and come" with the floor as weight was placed upon and removed therefrom.

SOME CAUSES OF CRACKS

Is it not to be expected that the wall paper and the plaster, too, would crack all up and down along the edge of stud *G*? We all have seen cracks in similar locations in buildings and often wonder why the cracks appear and what caused them. The construction here described would cause cracks in any house.

The manner of supporting the front porch or piazza floor when the latter is to be of concrete with brick balustrade is frequently a problem which vexes the builder more than a little. It is usually necessary that the foundation for the front wall should be run down the same depth as that of the cellar wall and other walls. Some times the side foundation walls may be stepped up and a shallow foundation put in for the front of the piazza construction, but such is not always the best way. When this method is employed it is well to fill the space under the piazza floor with cinders, gravel or whatever material is most handy for the purpose.

UTILIZING SPACE UNDER PIAZZA FLOOR

There is, however, a considerable amount of space underneath the piazza floor, which if saved, could be utilized for storage and for many other purposes, not the least of which is the growing of mushrooms. While on the trip in question I came across a row of houses, each of which was being built with a dark, fully inclosed space under the entire front piazza, leaving a fine space about 6 ft. one way by 18 ft. the other and 7 ft. high. In Fig. 2 is shown the manner in which the floor was supported while the concrete was hardening. The space under the porch was laid with a concrete floor, but as it was very soft a couple of planks were put down at either side as at *A* to support the 2 x 4-in. posts *B B*. Ledgers were tacked on at *C C C C* to stiffen the posts, which were spaced about 4 ft. apart. Braces *E E* were nailed to each pair of posts to support the middle of the 2 x 4-in. beams laid flatwise, and upon these beams was placed a floor of ⅞-in. shingle strips as at *F F*. On top of the boards building felt was laid down to make tight against water from the concrete. Some 5-in. I-beams were laid in as shown at *H* and blocked up on the concrete walls at either ends of the beams. The latter was spaced 5 ft. 6 in. on centers, and no beam was placed at either end of the porch floor, the block wall being sufficient to support the floor slab. In some of the houses reinforcing material was laid in between the flanges of the I-beams, particularly in that portion immediately in front of the door. In other houses no reinforcing material was used in addition to the I-beams as the thickness of the porch floor, 8½ in., was deemed sufficient to carry any load likely to be placed upon it.

CONSTRUCTIVE DETAILS

Around the outside of the porch wall "forms" were rigged up as indicated at *K*, these consisting of a plank 8½ in. wide and fastened lightly to the piece *M*, which was another plain scantling. Two

corners, *L*, were then fastened in place and the brace *N* placed underneath. In fact a brace was put in as often as was found necessary to hold the form in place, these varying from 4 to 6 ft. in the work I examined. As it was found somewhat troublesome to cut the braces *N* as wanted to just the right length to level the form *K*, the expedient was tried of putting shingle wedges between *M* and *N*. This trick worked well and made leveling easy.

The concrete was then placed and leveled off to the dotted line *J*, and after setting the "form" *K M* was removed, but the inside support was left until the porch floor was three weeks old, when it was removed by taking out the braces and ledgers, which were the only pieces that had been nailed. The posts *B B* in Fig. 2 were set out a little from the foundation wall, for the purpose of passing ropes around each remaining post after all had been removed save barely enough on one side to hold up the floor at *F*. With a man at each rope a quick

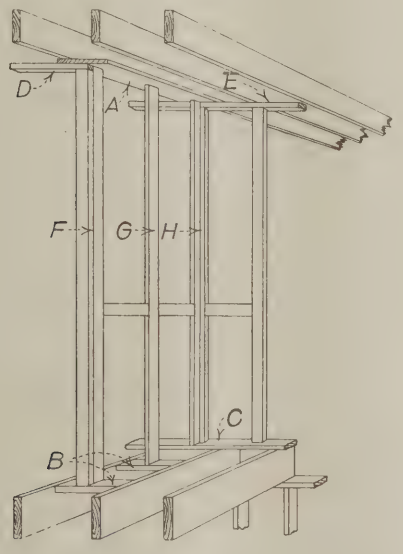


Fig. 1—A Badly Supported Partition

and strong pull together drew out the remaining stud on one side of the floor, the rope-pulling being done through a doorway leading to the main cellar of the house. As the remaining posts were pulled out together, down came that side of the false floor and the remaining posts, beams and floor boards were easily picked out and removed, leaving the under porch cavity clear for mushroom growing or for any other purpose.

If the designer of any house wishes posterity to "rise up and call him blessed" let him put windows in the principal closets. These need not be expensive, as a plain box casing costs but little to put in, glaze and hang, although it is very desirable that the sash in closet windows be made removable. Closet windows as a rule do not mar the effect from the outside, even when such windows are located close to other and full-size windows. The small window necessary for a closet seems to permits its use almost anywhere in the structure without ill effect. When small odd windows are to be cut in to light closets the writer would suggest that they be made for sash not larger than 15 x 21 in., and that they be so placed that they align with the tops of the full size windows nearest to them. If this is done such small window openings are seldom objectionable.

The recent windy weather in Indiana played havoc with the plastering and made necessary a considerable outlay for muslin window frames so as to keep the drafts off the green plaster. One contractor hit upon the novel expedient of procuring a lot of cheap burlap which was cut to size somewhat larger than the window openings and a piece spread over each window and held in place by four laths and three small nails in each lath. When not required any longer the cloth was quickly removed by drawing the nails, and fifty pieces could be quickly carried from one job to another by stuffing them into a meal sack. The transportation of the muslin frames from one job to another is always accompanied by considerable loss by breakage of frames and tearing of muslin, but the burlap will stand harder usage and, not being attached to a frame, does not get torn. Again the burlap can be cut to such a size as to fit almost any window opening, whereas the muslin frames must be made to order to fit the individual windows, or cut over

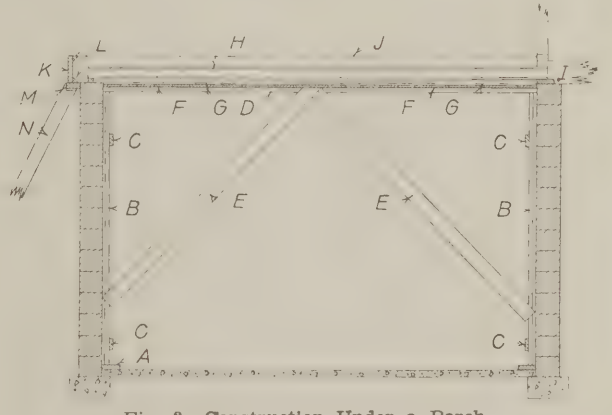


Fig. 2—Construction Under a Porch

to smaller sizes as required, and once a frame is cut down it is of no use for the large windows.

Several times during the trip in question I was forcibly struck by the exceedingly small size of the rooms in a number of the houses. In many instances it seemed as if the sole effort of the designer had been to get as many rooms as possible under the same roof so that the rental might be based on a 10-room house, even if the building covered only space enough for seven rooms of normal size.

What to do with the floors when the plasterers began operations is a problem which keeps many builders guessing in Indiana as well as elsewhere. In low-priced houses it is almost a vital necessity to put down a match board floor as soon as the studding are in place, the roof put on and before any of the partitions have been set. This materially lessens the first cost of the floor, but how to keep the floor in presentable condition during the plastering and painting is a problem which has been met in various ways. Perhaps the most common one is to cover each floor with an inch or two of clean sawdust

and then clean it all out after the plastering has been done. This, however, has its drawbacks, for plaster dropped in the sawdust cannot be picked up and used again as can plaster which falls upon a floor. Hence there is a considerable waste of plaster by the sawdust method. Another plan of floor protection found in frequent use in Indiana is to cover the entire area with a good quality of building felt and fasten the laps of the paper with lath cleats placed continuously over the joints. In the better class of houses where the floors are laid after plastering the walls a temporary floor of 6-in. low grade boards is often placed upon the joists for the workmen to use during construction. This floor is all removed before the permanent one is placed. Hence the boards forming the temporary floor and placed 2 or 3 in. apart so that all the sawdust, dirt and waste plaster falls through. This practice, however, leaves all kinds of dust and dirt upon the ceiling plaster and must add materially to the fire risk. The leaving of sawdust and shavings between the floor joists of a new house does not appeal to me as good practice, and there is no satisfactory way of getting the dirt out without damaging the plaster clinches, for if one sweeps hard enough to remove all the dirt he will surely do damage to the plaster.

A SECOND FLOOR SLEEPING PORCH

At one house they had just thrown out a second-story sleeping porch with four windows on the side and two windows at each end. The windows took up about all the room there was and left only space enough between them for the weight pockets. Only a single sash was to be used, and the frames were made with pockets for the sash, much the same as are used in street cars, where in order to lower the sash it is first necessary to raise it a trifle, swing it inward and then drop the sash into a pocket in the window stool. In these window frames the jambs extended down to the bottom of the sash pockets and the bottom sash was framed in at that point. The body of the porch was closed to about the height of ordinary chair molding, the outside being shingled upon 4-in. boards placed 2 in. apart and covered with building felt. The inside of the porch was to be plastered above and below the six windows, which occupy the entire wall space except room for three studs—two at the corners and one between the side windows.

The builder sometimes finds himself with a good bit of trim on the job when the house is to be plastered. If he leaves the trim on the piazza or in one of the rooms the masons will probably do all sorts of things to the fine lumber, for the plaster mason on any day in the week would rather have a nice clean board to use than one of his mortar-daubed culls which he brings with him. In this house the carpenter had evidently "been through the mill," for he had selected a place in the cellar just opposite one of the cellar windows where he nailed four hangers to the floor joists and then nailed a cross piece to each pair of hangers so that he could pass the trim right in through the cellar window and pile it close and tight under the floor of the building. When the carpenter came back after the plastering was finished he found his trim all safe, sound and clean, and he could get the piece he needed either through the cellar window or through the cellar itself. It was one of the nicest and best for storing and handling trim that I have yet seen.

In another house the cellar stairs were planned right in the middle of the cellar and ended directly against the middle of the cellar wall. In fact the last tread would touch the wall. The architect, however, got out of this predicament neatly and with credit. He cut off the stairs high enough—about three or four steps—to allow of a square platform the width of the stairs, then he designed a short run of steps on either side of the platform so that one could turn either to the right or left as he went up or down the stairs. The treatment of the cellar stairs looked much better to the writer than the putting in of a winding stair, and of course getting the turn invariably in the wrong direction.

ELECTRIC ICELESS REFRIGERATION

Electric iceless refrigeration has been installed in the Martin apartment building at 191 East Walton Place, Chicago, Ill., of which Howard Shaw was the architect. The system consists of a refrigerating machine, driven by an electric motor which circulates ammonia through cooling coils. A brine tank is placed in the ice receptacle of a good ice box and connected by insulated piping to the machine, which may be placed either in the lower compartment of the box for a small family or in the basement of an apartment building where several boxes are in use. The size of the machine is increased with the number of boxes in the building. There are no complicated parts, and the machine can be started and shut off as easily as drawing water from an ordinary faucet, for in very hot weather, when the thermometer reaches 90 deg., the machine may be kept running for a period of about five or six hours in every twenty-four, which will keep the interior of the box at about forty degrees. It has been figured out that if this box requires the equivalent of 150 pounds of ice daily the entire cost of electric operation will amount to $5 or $6 per month. The same refrigerator supplied with 150 pounds of ice daily, it is stated, will maintain a temperature in hot weather never below 50 deg., will cost considerably more to operate and that with the uncleanliness and waste. The *Economist* states that it has been the general opinion that electric refrigeration was much more expensive than the use of ice. If this is not true it would be well worth while for builders of apartment houses to investigate the matter and see what can be done about its application, because of its economy and its convenience.

In Colonial times it was the custom to build two log houses side by side rather than to construct one large one, owing to the difficulty of handling large logs, says *Hardwood Record.* Sometimes they remained separate houses, but with a common roof over them, the space between often being closed by weather boarding.

BUILDING SEGMENTAL BRICK ARCHES*

OBTAINING CORRECT SIZES OF BRICK TO BE USED—VARIOUS STYLES OF ARCHES

By W. H. Hefelfinger

IN Fig. 8 is shown a segmental arch laid up with stretcher brick. These brick should be cut wedge-shaped to make the most finished job. To get the shape and size of these brick, place two bricks on the segment, as shown in Fig. 8, *B*-1; measure the distance between them at the top, allow a little for heavier joint at top than bottom, and the remainder will be the amount to cut from the brick. Mark the brick as shown at *B*-2, Fig. 8, and cut off the part marked *X* with a chisel. Cut one half of brick on one side and one half on the other side, be either cut or ground, and the quickest way is to first make a pattern to mark them. There are several ways of getting the size of this pattern. One way is to make a full-size drawing of a part of the arch, lay off the size of brick and joint on extrados, run these lines to the center, and then measure the thickness of the brick at the intrados. Another way to find the size, and probably the most practical, but more liable to error, is to lay one course of brick to the center, then stretch a line from center point to upper corner of brick at extrados, and

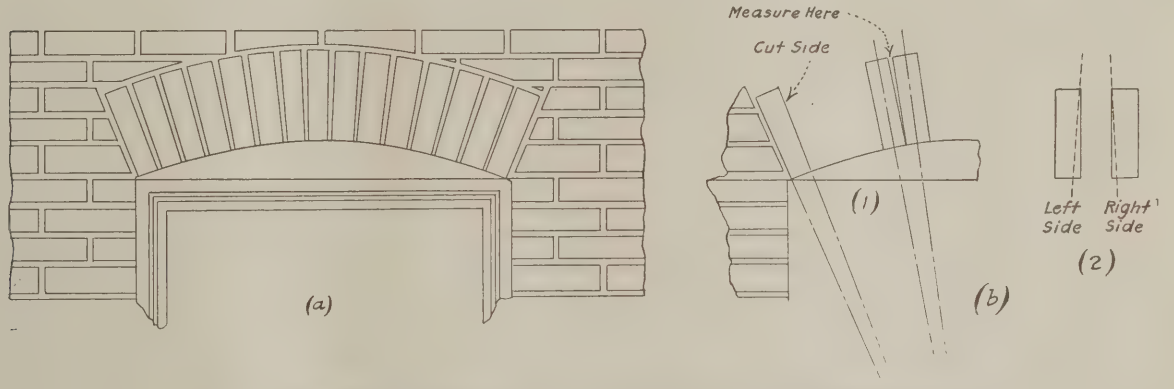


Fig. 8—A Segmental Arch Laid Up with What Is Known as "Stretcher" Brick

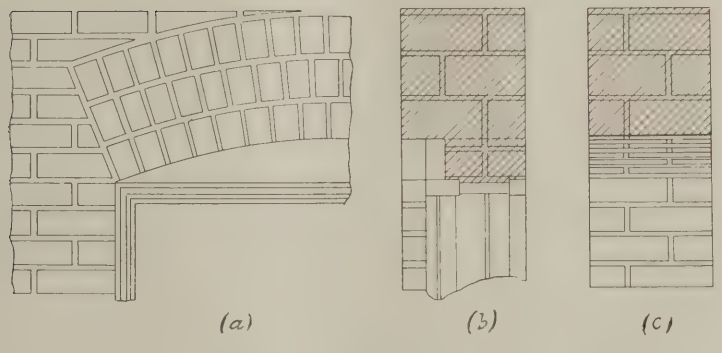


Fig. 9—Method of Laying a Three-Ring Arch

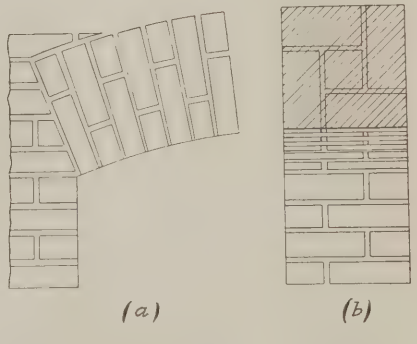


Fig. 10—Another Method of Laying Segmental Arches

and always lay cut side up; that is, cut side toward center of arch, as it keeps the soffit smoother.

Figs. 9, 10, 11 and 12 show some of the other ways of laying segmental arches. Fig. 9 shows a three-ring arch, and cross-section *B* shows construction over frame, and *C* shows bonded soffit. Any of the others may have bonded soffits also.

Fig. 13 shows a bonded semicircular arch. This arch is one whose intrados and extrados are half circles. The brick for an arch of this type must where line crosses brick at intrados you will have size of brick. See *O*, in Fig. 15.

The best way is to figure it out mathematically, as follows: Find the length of extrados, which is half the circumference of circle; divide this by thickness of one brick and one joint, which will give number of course. The number of courses should be an odd number, so they will bond at the center. It will hardly ever come out even, but difference may be made up in the joints. Find length of intrados, divide by number of courses, subtract size of joint, and you have size of brick.

*Continued from page 39, October issue.

To make this explanation clear I will apply rules to Fig. 13, which arch has a span of 3 in. and a depth of 12½ in. Length of extrados equals half of 3 1/7 x 51 in., or 8 ft. Figuring each joint and brick as 3 in., it will take 32 courses, but as we must have an odd number, and joints are rather large, we will make it 33. Length of intrados equals half of 3 ft. x 3 1/7, or 4.725. Divide this by number of courses, and we have 1.72 in. Subtract about ⅜ in. for a joint, and we have about 1⅜ in. for brick at intrados.

After having determined the thickness of brick at the intrados, a pattern, as shown in Fig. 14, may be made. *A* equals the thickness of brick, and *B* equals calculated thickness of brick at intrados.

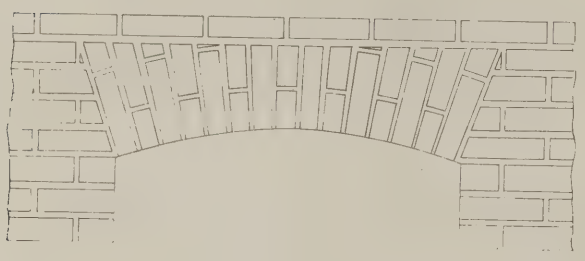


Fig. 11.—Still Another Style of Segmental Arch

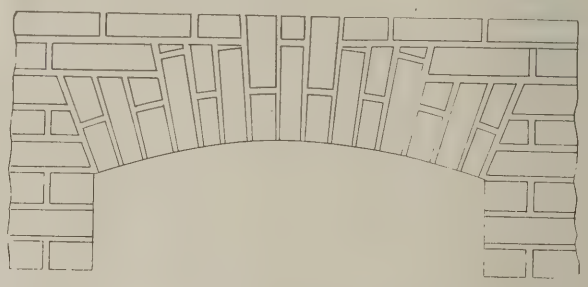
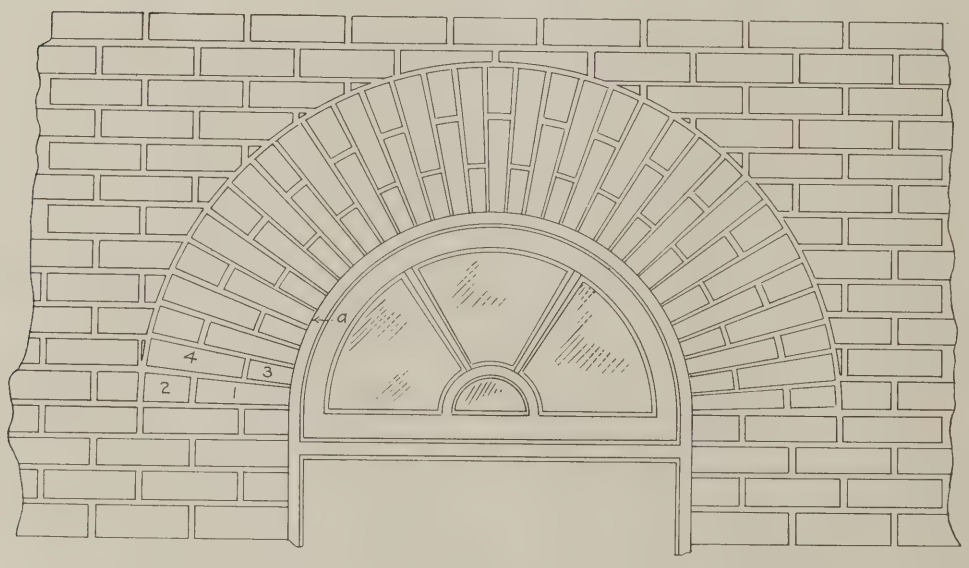


Fig. 12—A Fourth Method of Laying Segmental Arches



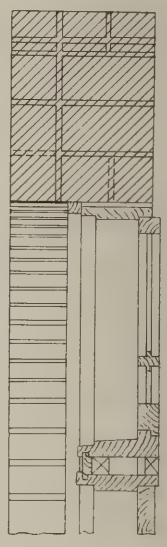


Fig. 13—Elevation and Vertical Section of a Bonded Semicircular Arch

In an arch of this kind we have four different shaped brick. Nos. 1, 2, 3 and 4, on drawing in Fig. 14, show where to place the brick to get the right size, and numbers in Fig. 13 show where they are laid. The pattern should be laid out on both sides of the board, as each side requires a different pattern on account of cut face being laid up. In laying up an arch of this kind always use a line as shown at *D*, Fig. 15. After laying up about five courses, measure them, and space off that distance on the center from the wall on each side, points *A*, Fig. 15; then measure remaining space to see if it comes out right. Sometimes it becomes necessary to vary the spaces a small amount to come out right. These points also act as guides in laying the brick.

Arches of this type are seldom cut all the way through unless the soffit and both sides of the wall are finished, but built as shown in section of Fig. 13. Figs. 16 and 17 show several other types of semicircular arches, three-ring rowlock and one-ring stretcher.

BUILDINGS OF "MILL CONSTRUCTION"

"Heavy Timber Mill Construction Buildings" is the title of a comprehensive publication just issued for architects and builders by the National Lumber Manufacturers' Association, and written by E. C. Paul, construction engineer, Chicago, Ill. In explaining the subject matter, the following statements are made:

"The term 'mill construction,' as commonly used, is the name given to that type of building construction in which the interior framing and floors are of timber arranged in heavy, solid masses, and smooth, flat surfaces, so as to expose the least number of corners and to avoid concealed spaces which may not be reached readily in case of fire.

"A broader interpretation of the term includes the meaning given above and adds the specification that the building shall be so constructed that fire shall pass as slowly as possible from one part of

the structure to another. This means that each floor should be separated from all others by incombustible walls or partitions and by doors or hatchways which will close automatically in case of fire near them. Stairways, belt passages and elevator shafts are encased, or preferably located in fireproof towers. Openings in floors for passage of belts, etc., are either avoided or fully protected against passage of fire or water. The proper installation of an approved automatic sprinkler system is of great importance. Ceilings in rooms where highly inflammable stocks are kept, or where hazardous processes are followed, should be protected by the use of a fire-retardant material, such as plastering laid on wire lath or expanded metal. The ceiling

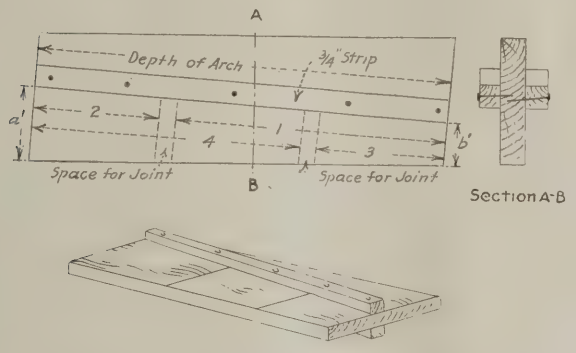


Fig. 14—Details of the Pattern for Obtaining the Correct Size of the Brick

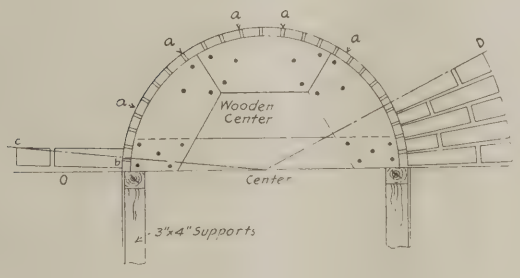


Fig. 15—Wooden Center for Laying Up an Arch

should follow the lines of the timbers without an air space between the two surfaces.

"Mill construction has always been looked upon with favor for buildings in which ordinary manufacturing industries are carried on. Warehouses, and buildings for storage of merchandise, stores, office buildings, factories, shops, and all buildings of moderate height which are not to be used for extremely hazardous purposes, from a fire-protection standpoint, are later developments of this type of construction. City building codes limit the height of building and size of open spaces in buildings. They also specify the minimum sizes of timber which shall be used, and other similar details."

An idea of the building activity in Baltimore, Maryland, may be gleaned from the fact that one day in October three concerns made applications for permits to erect sixty-two dwellings estimated to cost $115,600.

HANDBOOK FOR ARCHITECTS AND BUILDERS

The nineteenth annual edition of the "Handbook for Architects and Builders," edited by Emery Stanford Hall, and the official publication of the Illinois Society of Architects, under whose auspices it is issued, has just been distributed among the membership of the Society. The publication aims to provide under one cover information which the architect requires daily and, although intended primarily for architects practising in Illinois, it contains matters of interest to builders everywhere.

The contents include a list of architects licensed to practise in Illinois, a copy of the Chicago building ordinance, together with special rulings of the building department of that city, standard specifications of hollow tile fireproofing, standard specifications for concrete work, together with valuable information concerning concrete construction, heating and ventilation, office practice recommended by the Society, architectural acoustics, several new tables by Winslow and Mensch on concrete construction, the Orders of Architecture, together with many other tables and formulæ of special value to the architect and builder. A comprehensive index facilitates reference.

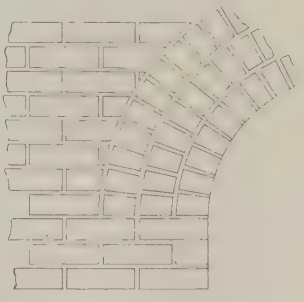


Fig. 16—Detail of a Three-Ring Row Lock Arch

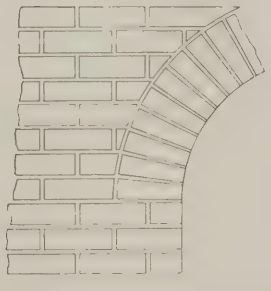


Fig. 17—Details of a One-Ring Stretcher Arch

A series of tests has just been carried out by the British Fire Prevention Committee, the results of which tend to prove that sawdust intimately mixed with bicarbonate of soda and applied in bulk has certain advantages over sand and similar materials for putting out comparatively small fires caused by the ignition of the vapor of petroleum spirit and other inflammable liquids.

A SUBURBAN HOUSE OF SEVEN ROOMS

CENTRAL HALL AND LIVING ROOM NOTICEABLE FEATURES—VARIOUS DETAILS OF CONSTRUCTION

WE have taken for the basis of our colored supplemental plate this month a Colonial residence of seven rooms and bath, finished on the exterior with siding and with roofs covered with shingles. The chimneys are of brick with the exposed portions finished with stucco designed to match in texture the base around the house which is also of stucco finish.

FOUNDATIONS AND FRAMING

The 12-in. foundation walls are to be built of brick and have a finish above grade of two-coat stucco work. The framing timbers are to be 2 x 10 in. for the first tier of floor beams, 2 x 8 in. for the second tier and 2 x 6 in. for the attic, all of spruce or yellow pine and with 2 x 6-in. rafters spaced 16 in. on centers. The girders supporting the first floor beams are to be 6 x 8-in. yellow pine, securely strapped and resting on 16 x 16-in. brick piers, bonded every fifth course with bond stones. All studs are to be 2 x 4-in. spruce or hemlock placed 16 in. on centers and doubled around all window and door openings.

The exterior framework is to be covered with pine sheathing boards dressed on the outside, laid diagonally and covered with building paper over which is to be placed the siding. The roofs are to be covered with shingles laid in regular courses and exposed 5½ in. to the weather.

The flooring is to be comb-grain tongued and grooved maple and blind nailed. The exterior cornice is to be formed of plain design of white pine or cypress and to return as shown on the elevations presented on the facing page.

The main entrance door is to be built up on a white pine core. All other doors are also to be of the built-up type and to be panelled, all being finished to match the trim.

PLASTERING AND INTERIOR TRIM

The various rooms are to be plastered two-coat work with a hard white finish or a sand finish for the living room, dining room and main hall according to preference of the owner.

The interior finish is plain throughout, the hall stairs to be finished with plain post and balustrade and the general trim of the various rooms to be of plain pattern and design with an artificial beam ceiling for the living room.

The plumbing fixtures are to be set, as shown on the plans and laundry tubs in the cellar. All fixtures are to be properly connected to the main soil pipe and vented.

The bath room is to have a floor of white tile laid on a bed of cement and cinder fill constructed between the floor beams.

The house is to be wired throughout for electrical service and piped for gas, the fixtures to be of the combination type or they may be provided for either system should the local accommodations be limited.

The heating is to be by means of a hot-air furnace located in the cellar. There are to be registers in every room except the kitchen, also a register in the hall; an intake box is to be provided as well as all necessary appurtenances and appliances for a complete heating plant with ample capacity to heat the room farthest away from the source of heat to 70 deg. when it is zero weather outside.

The siding is to have three coats of paint and of a color to be selected by the owner. The roof shingles are to be dipped in stain before being laid and then given a brush coat after they are in place on the roof.

The interior trim is to be stained and the floors shellaced and varnished.

The hardware is to be of modest design and all necessary window catches, door locks, etc., are to be provided.

LAYOUT OF THE ROOMS

An examination of the floor plans shows the living room with its mantel of plain tapestry brick to be one of the noticeable features of the interior arrangement. The living room extends the full depth of the house and is lighted by triple windows front and rear with two windows in the end gable. A central hall extends entirely through the building and from it rises the main flight of stairs leading to the second story. Under the main flight are the stairs giving access to the cellar. Between the stairs and the kitchen is a commodious pantry which communicates directly with the dining room. The kitchen is shut off entirely from the dining room, an arrangement which tends to keep out the odors of cooking.

On the second floor are four sleeping rooms and bath room, all readily accessible from the stair hall which occupies the central portion of the building.

Each bedroom is provided with a clothes closet and opening from the hall is a linen closet. The stairs leading to the attic rise from a point just outside the bath room door.

CUBICAL CONTENT

The architect estimates the cubical content of the house to be 27,216 cu. ft. and he gives a unit price of 22 cents per cu. ft. He states that this figuring includes the contractors' customary profit, but the cost of the house will vary depending upon labor conditions and the locality in which it may be built.

It was designed by Architect Frank T. Fellner, 413 Caton Avenue, Brooklyn, N. Y., or care of the BUILDING AGE, 50 Union Square, New York City.



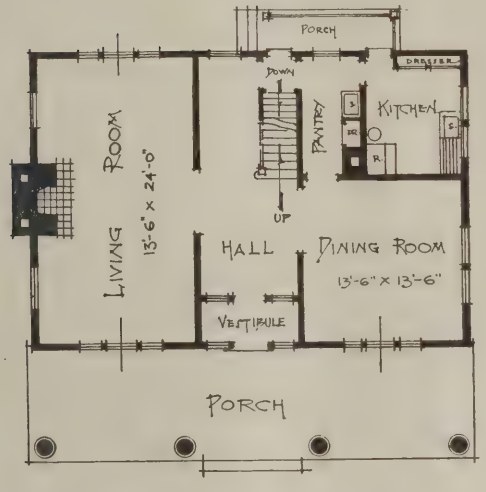
BUILDING AGE



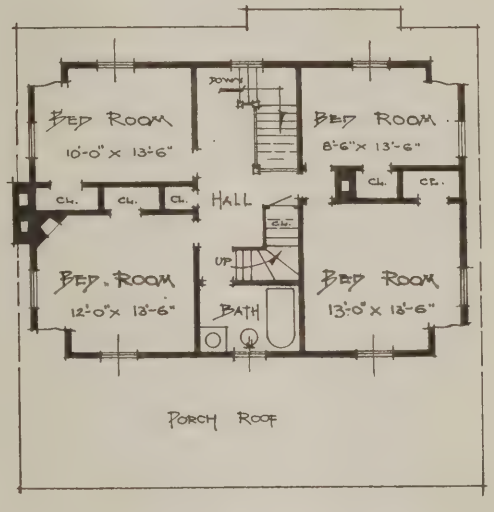
SIDE ELEVATION



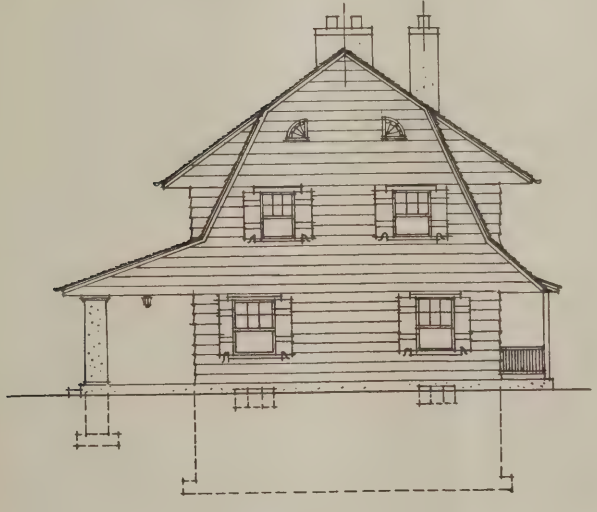
FRONT ELEVATION



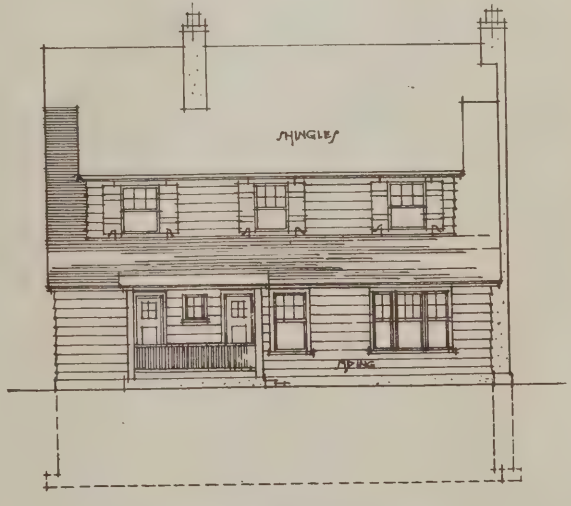
FIRST FLOOR PLAN



SECOND FLOOR PLAN



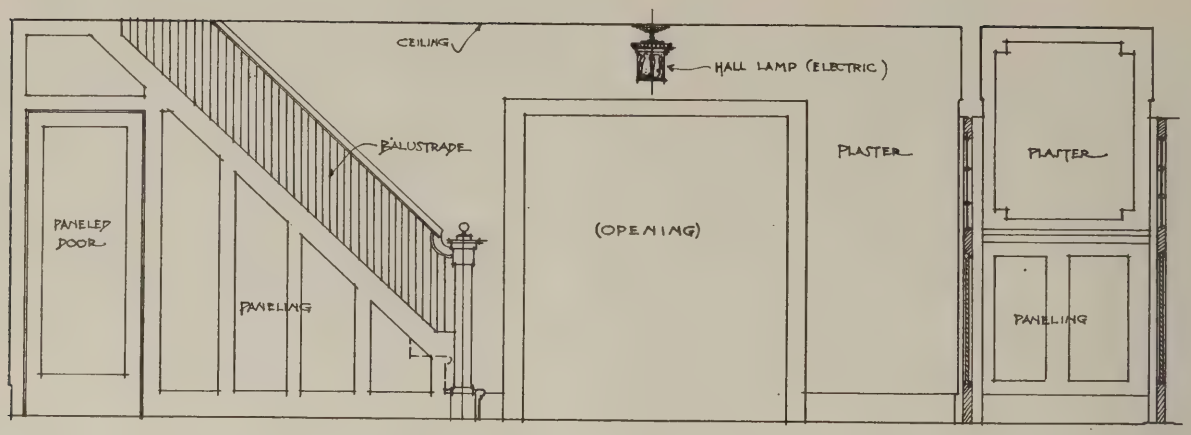
SIDE ELEVATION



REAR ELEVATION

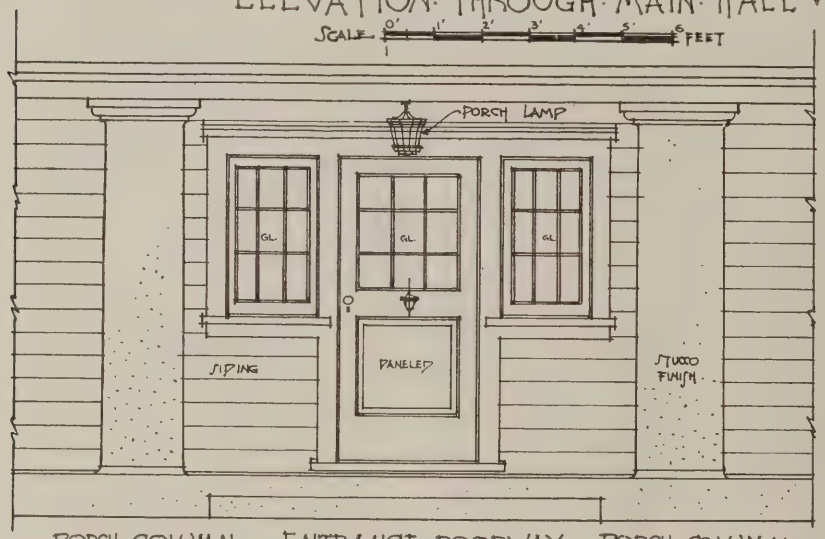
SCALE 0' 4' 8' 12' 16' FEET

PLANS AND ELEVATIONS OF SUBURBAN HOUSE SHOWN ON SUPPLEMENTAL PLATE



ELEVATION THROUGH MAIN HALL

SCALE 0' 1' 2' 3' 4' 5' 6 FEET

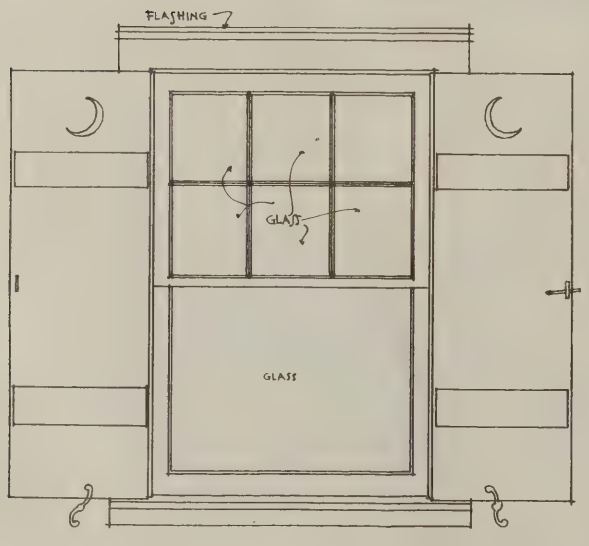


PORCH COLUMN ENTRANCE DOORWAY PORCH COLUMN

ELEVATION OF FRONT DOOR

SCALE 0' 1' 2' 3' 4' 5 FEET.

ELEVATIONS & DETAILS SHOWING INTERIOR VIEW THROUGH VESTIBULE & MAIN HALL, ALSO FRONT ELEVATION OF ENTRANCE DOORWAY & TYPICAL 2ND STORY AND ATTIC WINDOWS FOR 7 ROOM DUTCH COLONIAL HOUSE

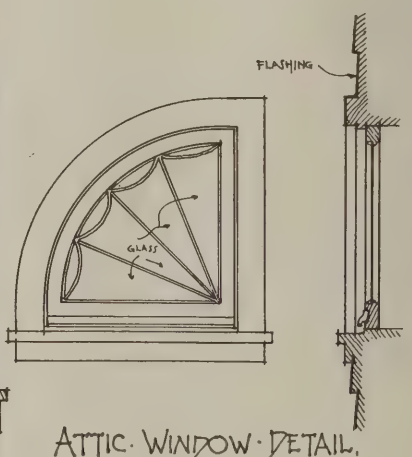


TYPICAL 2ND STORY WINDOW

SCALE 0' 1' 2' 3' 4 FEET



SECTION



ATTIC WINDOW DETAIL WITH SECTION

MISCELLANEOUS DETAILS OF SUBURBAN HOUSE SHOWN ON SUPPLEMENTAL PLATE

SOME WELL-ARRANGED FARM BUILDINGS

ADVANTAGES OF HOUSING STOCK IN ADJACENT BUILDINGS—HOLLOW TILE SILO AND MILKHOUSE

AN interesting example of a well-arranged farm, with modern buildings where all of the stock can be cared for without going out of doors, is to be found on the Adams Farm at Racine, Wis. Here is an instance where two large frame buildings are joined by a feed room, one accommodating a sanitary, light and well ventilated dairy barn on the ground floor, a horse barn on the first floor, and hay mow above, while the other has a ground floor cow barn and also a hay mow. A 150-ton silo has been built outside the feed room and between the two barn buildings, the location being such that the trucks can be loaded directly from the silo on the inside and the mangers filled in each building without loss of time. A few feet to the south of the barns is a milkhouse and adjacent boiler and washroom, all of which present a group that is compact, of attractive appearance and embodying features in design and equipment that are interesting. The farm has capacity to take care of seven horses and thirty head of cattle, stanchions being provided for twenty-one milkers. The hay mows will hold a total of 100 tons of hay, the mow over the combination barn 40 tons, and that over the cow barn 60 tons. All buildings have an east frontage, and the use of hollow tile and concrete in the construction is commendable from the standpoint of cleanliness and economy.

The dairy barn has dimensions of 36 ft. wide and 48 ft. long, with an 8-ft. ceiling. A canopied entrance on the south side and stairs to the first floor at the front are provided, with half doors on the west leading to a yard. An abundance of natural light floods the barn through windows on all sides and the walls are plastered white. Running the length of the barn are twenty-one stanchions, in rows of ten and eleven, each compartment being equipped with a galvanized iron manger and watering bucket. The mangers in each row face one another and the alley is 6 ft. wide, so that the filling of mangers can be accomplished without loss of time. The barn is ventilated by rectangular ducts on the north and south walls, which are continued up through the horse barn and hay mow, connecting to a 30-in. ventilator on the roof. A litter carrier runs around three sides of the building, a branch to the boom in the yard being run through one of the half doors. The carrier is also continued through the feed room and cow barn, as shown on the accompanying floor plan.



MILK HOUSE, HORSE AND DAIRY BARNS WITH SILO ON THE ADAMS FARM

The feed room measures 20 x 24 ft., sliding doors separating this section from the dairy and cow

barns. The silo is situated on the east and the room is plenty large enough to accommodate a feed machine and two large trucks. A 12 x 12-ft. engine room is west of the feed room, with door between.

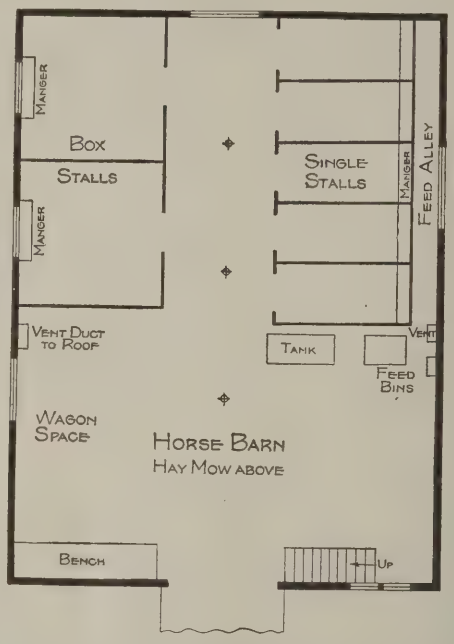
The cow barn is 38 ft. wide and 42 ft. long, and houses a large bull pen, calves' pen and three box stalls, all conveniently arranged. A wide alley allows the feed truck to fill the mangers without trouble, each compartment being provided with mangers. Windows are installed on all sides of the barn and doors on the west side to the yard.

The horse barn is 9 ft. high and occupies the same floor area as the dairy barn, and on the east side is a sliding door, 10 ft. wide, at the top of a graded embankment. To the left of the entrance is a work bench running to the south wall, a space 12 x 20 ft. being utilized to accommodate wagons. Hooks are provided on the walls and posts to hang harness. On the south side of the building are two 12 x 12-ft. box stalls, each having a window over the manger. On the opposite side are five single stalls, 5 x 12 ft., with a feed alley conveniently run on the manger side. A watering tank and feed bins are provided at points shown on the accompanying plan. To the right of the entrance is a stairway to the hay mow, a feed chute being built near the top of the stairs.

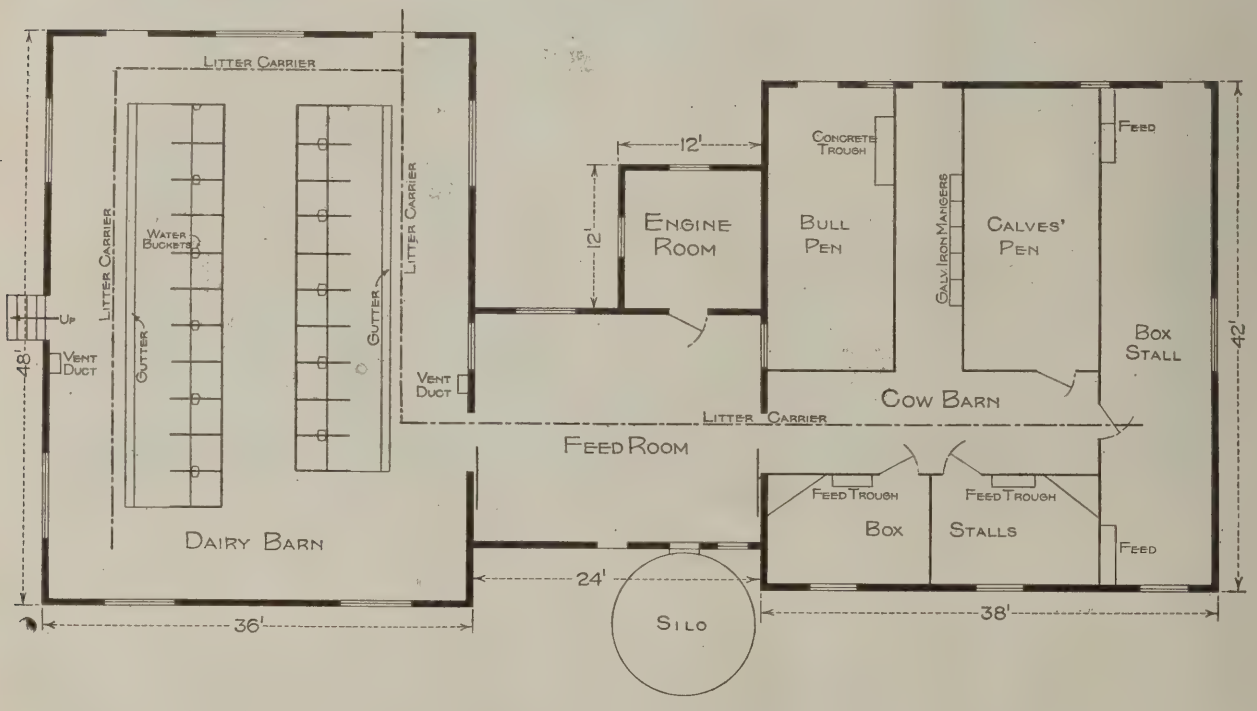
The hay mow is roomy, and a Strickler hay carrier, complete with forks and sling, is installed. At the east end of the mow is a hay door at the floor line and a larger door above, the latter being flanked on either side by a large window. A win-



Showing Stanchions in the Dairy Barn



Plan of Horse Barn—Scale 1/16 In. to the Foot



Plan of Dairy Barn and Silo, Showing General Arrangement—Scale 1/16 In. to the Foot

dow near the ridge at the west end of the mow assists in lighting this section, the hip roof being 8 ft. high above the walls.

The milk house has dimensions of 12 ft. wide, 18 ft. long and 8 ft. high, divided into two sections. The east half houses the mechanical equipment, consisting of a Perry air pressure water system, the tank, pump and motor being arranged as shown on the accompanying floor plan. On the north side of this section is also a small tank, a milker pump and a lavatory in the corner. A concrete watering tank, milk cooler and cream separator are installed in the rear half of the building. The tank has outside dimensions of 5 ft. 8 in. long, 26 in. high and 40 in. wide, the walls being 4 in. thick. An 18 x 18-in. trap door over this room reveals an attic, the building being ventilated by two galvanized iron pipes installed at the ridge. Each section is lighted by three 18 x 24-in. windows on as many sides, with doors as shown.

The boiler and washroom is practically a duplicate of the milkhouse, measuring 12 x 20 ft. At the time of writing the building has yet to be completed so far as interior finish is concerned.

Hollow tile has been used extensively on this farm in the construction work and is an indication of its growing popularity for the building of rural structures. It is safe to say that the initial cost is the last cost, for hollow tile is durable and insures protection against the ravages of wind, fire, water and vermin. The rich brown surfaces present a pleasing contrast with the layers of mortar, making an attractive appearance and eliminating the necessity of frequent painting or other maintenance expense. Both exterior and interior surfaces are glazed and will not absorb moisture, an important feature that will appeal to the farmer who demands dry buildings. The insulating properties of the air spaces in the tile prevent dampness penetrating the walls and they keep the building cooler in summer and warmer in winter. Owing to their lightness, the tile are easy to handle, comparatively inexpensive to lay and permit speedy construction. The satisfaction and increased efficiency secured from neat, dry and warm buildings make this form of construction particularly desirable on the farm. All hollow tile used is "Natco," made by the National Fire Proofing Co., Pittsburgh, Pa.

In the construction of the milkhouse and boiler and washroom 8 x 8 x 16-in. tile was used, forming an 8-in. wall, and ten courses of tile built to the eaves on concrete foundations. Rock face tile is used for corner work to produce a more artistic effect, and the exterior and interior surfaces are left in the natural state. The milkhouse has a concrete floor which is pitched to a floor drain, and in front of the east entrance is a 3 x 6-ft. concrete slab. All doorways are 6 ft. 6 in. high and vary slightly in width.



REAR VIEW OF HORSE BARN WITH DAIRY BARN AT THE LEFT AND HOLLOW-TILE MILK HOUSE AT THE RIGHT

In constructing the horse and dairy barn, 24-in. concrete footings were provided and 8-in. foundation walls of vitrified tile with double air space built of 8 x 8 x 16-in. tile. The floor of the dairy barn is 6 in. thick and rests on a 4-in. bed of cinders, the finished floor being pitched from the center toward the sides of the building. A double row of steel posts line the center of the dairy barn and are placed back of the mangers in every third stall, securely anchored in the concrete floor and capped

with concrete beneath the beams. The stall posts, partitions and top rails are built of steel tubing, the stanchions being connected both top and bottom. The mangers and watering buckets are of galvanized iron. All barn equipment is of a type made by the James Mfg. Co., Ft. Atkinson, Wis. Each stall is 3 ft. wide and 3 ft. 6 in. long, and back of the stalls is a long concrete gutter, 16 in. wide and 6 in. deep.

The floor of the horse barn is of reinforced concrete, 6 in. thick. The framing of the building is



Hollow Tile Milk House, Boiler and Wash Rooms



View of Litter Carrier, Showing Boom, Guy Wires, Swinging Crane, Etc.

simple and typical of Middle Western practice. On the foundation walls are 2 x 6-in. plates, while the studs, rafters and braces are of the same size material. Girders are 8 x 8's and floor joists 2 x 8 in., and the walls covered with 6-in. drop siding. Braces and collar beams are 2 x 4's. The roofs of all buildings are covered with best white cedar shingles, exposed 5 in. to the weather.

The silo is 14 ft. in diameter and 38 ft. high. In the building of it regular "Natco" 12 x 12 x 6-in. silo tile were used. All exterior woodwork received two coats of paint.

The carpentry work was done by Newton Brown and the masonry work was executed by James Due, both of Racine, Wis.

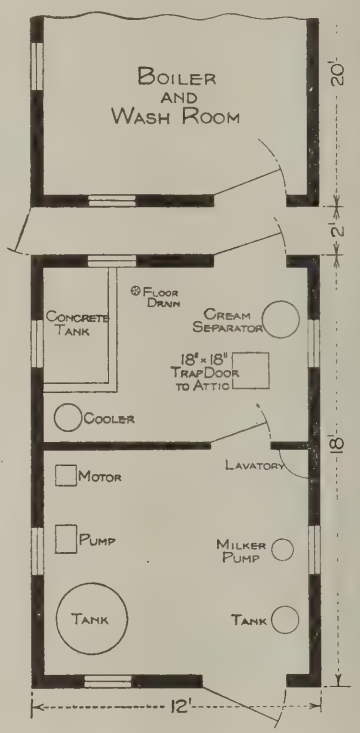
Fence posts in Argentina are made of quelbracho wood, which is exceedingly hard. It is said that the posts last forty years.

A FACTORY BUILT ON CONCRETE PILES

A factory has recently been completed in Montreal, Canada, which has its foundation built on about 400 Raymond concrete piles. This construction was necessary owing to the peculiar nature of the soil. In addition, the ground is underdrained, so that four catch-basins, one at each end and one at each side, are provided.

The structure is in two sections, one of four stories and basement, the other one story and basement. Heavy mill construction, designed by W. B. McLean to fit the requirements of the case, is used.

To minimize fire losses, and insure the safety of the employees, each floor is entirely separate, and can only be reached from a fireproof stair tower protected by fire doors at every floor. In this way,



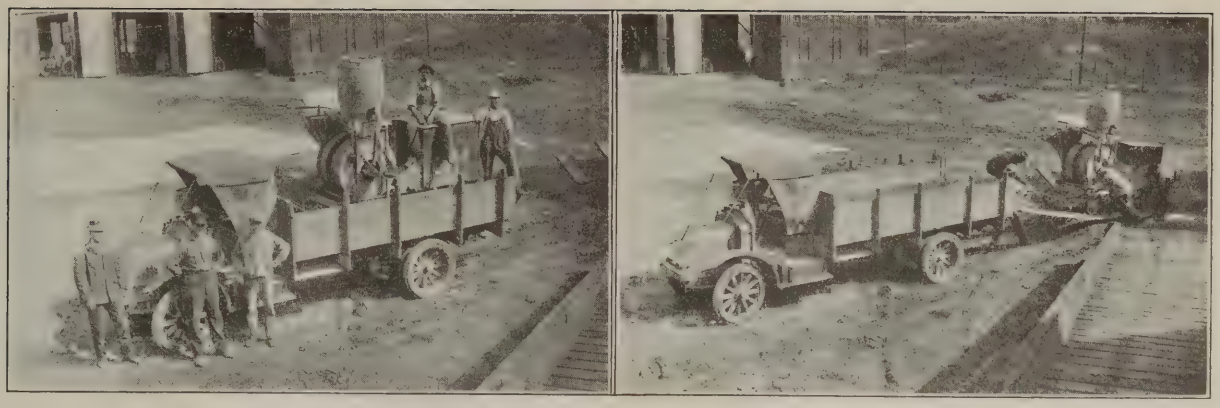
Plan of Milk House—Scale ⅛ In. to the Foot

a fire in any of the departments would be confined to that room. The stairway is of concrete.

The elevator runs in a heavy brick tower, also shut off by fire doors at each floor. This tower is extended above the roof to carry the sprinkler tank.

The building is of plastic brick, with windows of steel. The floors are supported by beams of Douglas fir, with Duplex hangers and post caps. The roof was built to Barrett specifications. The building also has an efficient sprinkler system.

The volume of building operations in the District of Columbia for the fiscal year ending June 30, 1916, was the greatest since 1912. The grand total for all operations, according to the annual report of Building Inspector Morris Hacker, was $13,495,535, which is an increase over the previous fiscal year of $4,895,603.



A 1½-TON "KELLY" MOTOR TRUCK OWNED BY T. A. GRAHAM OF SPRINGFIELD, OHIO—LOADING A CONCRETE MIXER

MOTOR TRUCKS AID BUSINESS EFFICIENCY

CONTRACTORS AND BUILDERS FIND THEM SUPERIOR TO HORSES AND WAGONS AND ADVOCATE THEIR USE

IT has been estimated by an expert in the motor truck industry that possibly not more than one per cent of the contractors and builders in the field of moderate cost construction are using motor trucks, and his figures do not include trucks used by building material houses or concerns undertaking contracts for such work as office buildings, industrial plants and structures of that character. If trucks to advantage, and further evidence is obtainable that many contractors in Central Western and Eastern States find trucks indispensable in the successful conduct of their business. The very fact that they are being used is sufficient evidence of the economical worth and necessity of modern road transportation wherever they are needed.

The investigation conducted in the Middle West,



A "FEDERAL" MOTOR TRUCK USED BY A FIRM OF BUILDING CONTRACTORS AND PLUMBERS

his estimate is anywhere near true, then it is logical to believe that motor trucks are not required by the majority of these contractors or that they have not given serious consideration to the efficiency and economy of the power wagon as compared with the horse and wagon.

Investigation has shown, however, that in the State of Illinois there are many carpenters and builders, in large and small towns, using motor which was naturally somewhat limited in its scope, showed the prevalence of an almost unanimous opinion that a light truck is an ideal one for general use. The majority of the men interviewed were using one-ton trucks, though some were of lighter or heavier capacity, but none exceeded two tons. Many had improvised trucks in the form of a substantial box securely held in place at the rear of a Ford roadster, and it was learned that small stuff can be carried on

such a car without fear of overloading the machine, and the cost of upkeep is extremely low. In a general way every man spoke enthusiastically of the efficiency of trucks over horses and wagons and considered them indispensable to their business. Since acquiring trucks many have increased the radius of their working territory without materially increasing their overhead expenses from the standpoint of delivery costs. Instances were cited to show that certain business could not be undertaken profitably were it not for the fact that a truck is maintained for hauling materials, equipment, and even men, when occasion required.

Practically every contractor is confronted with the problem of delivering something at some time or another, if not regularly, from the shop to the job. Where stocks of lumber, cement, etc., are kept in the shop or yard, the possession of a light truck is not only responsible for getting materials to the work at the right time, but, furthermore, the contractor is able to get around to the various jobs himself and keep in close touch with all operations. Many contractors and builders utilize trucks to take men from one job to another, especially in the larger cities, where wages are high and time a very important factor.

COMPETITION AND THE MOTOR TRUCK

The pressure of competition often compels a man to buy a motor truck. Others purchase them through force of necessity, for it is often costly to have to depend on teams furnished by another party, and they prefer to invest in a motor truck rather than have to wait someone else's convenience. Supplies can be transported promptly and economically from the freight cars to the job, and the same can be said of handling concrete mixers, saw rigs, etc. This is especially true where country work is done, though some territories have such bad roads that motor trucks are out of the question so far as the contractor is concerned.

The contractor and builder contemplating the purchase of a motor truck is confronted with the problem of just which one to buy. This question involves the radius to be covered, the nature of the average load, and the condition of the roads in his immediate and surrounding territory.

The man who will chart daily the number of deliveries his wagon makes, ascertaining the weight of each load and the number of miles covered, is best fitted to select a truck of the capacity which will operate most economically in his service. When a single truck is operated, reports from the driver should be kept showing the daily expense. Such a chart will readily tell the owner when waste is occurring or when his machine is not receiving the right amount of care.

WAGONS VS. MOTOR TRUCKS

The extent to which the automobile and motor truck are displacing the horse-drawn vehicle is indicated by a report of the census of the carriage and wagon industry, just issued by Director Sam L. Rogers of the Bureau of the Census of Washington, showing that the number of carriages and wagons manufactured in 1914 was 397,569 less than in 1909, a decrease of 25.1 per cent. Likewise the value of the total number of these classes of vehicles decreased $21,754,002, or 23.1 per cent.

To those who have accepted horse transportation, its cost and limitations, for so long a time, it is difficult for them to see the many advantages of the power wagon without first being shown figures substantiating the claims of the truck.

TREATMENT OF THE TRUCK

The owner of a horse and wagon has been accustomed to let his team run until the wagon broke down or the horse became sick. If he is inclined to treat his truck the same way, such treatment will prove expensive in the long run. Overloading a truck should be avoided at all times, as additional weight above the rated capacity strains the engine, and bad roads will affect the tires and general condition of the machine. The main reason that overloading is permitted at all is because the cost of it is not immediately apparent. It must be borne in mind that this cost must be paid sooner or later.

In many instances men are justified in criticising the amount of money that must be spent for investment and upkeep, because they feel that the amount of business they transact annually does not warrant the purchase of a modern light truck. It is not the purpose of this article to say that every carpenter and builder should buy a truck, but this is true, and the following evidence will prove the contention, that any contractor using one or more teams can do more work in a wider territory at less expense with a light auto truck.

SECRET OF TRUCK ECONOMY

The secret of making a truck save money is in keeping it busy all the time and so arranging the hauls that it will be necessary to make the fewest number of empty trips. It is absolutely necessary that the machine be kept in good condition. Like all other machines, when one part of a motor truck is kept in service after it is badly worn, other parts begin to wear more rapidly than they should, and general breakdown soon results. A good truck, properly used, should pay for itself inside of four years and still show a very fair profit.

The advertising value of the truck should not be overlooked. It is an acknowledged sign of modern equipment and progressiveness, and as such invites confidence. A man operating a 1000-lb. truck said:

It costs one-third for gasoline compared with the cost of feeding a horse.

It requires one-half the time to fill the gasoline tank, oiler, grease cups, oil all parts and occasional cleaning of spark plugs, compared with the time required to feed and clean a horse.

The distance covered by a horse and wagon and the speed which it makes are very limited. The distance we can cover with our truck is unlimited, and in the city we can travel 18 miles per hour.

A horse must be fed and watered whether working or not; a motor truck consumes only while in motion.

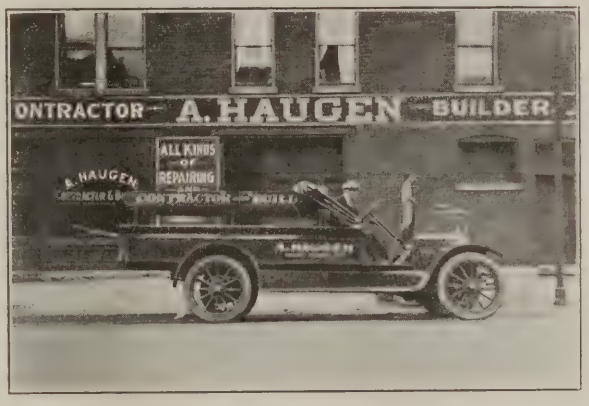
The owner of a 1½-ton Federal truck, made by the Federal Motor Truck Co., Detroit, Mich., who also operates horse teams, attached hub recorders to the machine and a wagon in order to better compare their earning capacity in his business. The wagon was loaded and unloaded in exactly the same manner as the truck, but the machine covered 3.66 miles to every one for the team. The truck hauled

each load twice as far, yet it made twice the number of deliveries. The running and stopped time made by the team figured out at 1.64 miles, while for the truck it was 7.15. This greatly increased earning capacity cost the operator $1.28 per day more.



The "Chicago" Motor Truck of M. H. McLean, a Chicago Carpenter and Builder

The owner of a one-ton Little Giant motor truck, made by the Chicago Pneumatic Tool Co., Chicago, Ill., who does a contracting business, said that his primary reason for buying a truck was to get a vehicle that would handle light orders quickly. He finds it especially valuable for country work, and states that without the truck it would be impossible to go out of town and make money. If the men had to be driven in a horse and wagon to the job, the time lost going and returning would eat up all the profit, more especially where the workmen would have to be boarded. At the present time he handles jobs within a radius of 10 miles. In many instances the truck leaves town at 6.30 a. m. and has the gang on the job ready for work at 7 o'clock. He then brings the truck back to town for local use and goes back to the job later in the day to get the men back to town by 5 o'clock. No time is lost, and the men are all kept good natured because they get home as soon as they would if they were working in town. As to the cost of operation, mileage considered, the truck is a good deal cheaper than horse and wagon delivery, and from the standpoint of service the owner thinks that there is absolutely no comparison, the truck being considered indispensable.



The One-Ton "Sterling" Motor Truck of A. Haugen, a Chicago Builder and Contractor

The J. L. Simmons Co., contractors and builders of Chicago, have used a Velie truck, made by the Velie Motor Truck Co., Moline, Ill., with much success for many years. In connection with its work on the Moline, Ill., high school building, the entire hauling of materials from freight cars to the building was done with the truck and accomplished what it would require five teams to do. This distance covered was nine blocks, two of which were up a 20 per cent grade. In handling the material the company used six skips, each holding about 1000 brick, and while two of the skips were being loaded at the cars, two were sent up to the job on the truck, and on arrival at the building were lifted off with a boom derrick and the two empties replaced on the truck. By this method the truck did not have to wait to be loaded or unloaded, except as the derricks at the cars or the building lifted the skips off or onto the truck. This procedure enabled the company to keep the cost of placing the brick from the cars to the building at less than $1 per thousand, and all other materials relative as low. The truck operated almost continuously through a 9-hour day and used less than 8 gal. of gasoline.

Louis A. Riffle, a Chicago carpenter-contractor, does not believe a horse and wagon could do the same amount of work as his one-ton Atlas truck, and the former used to cost him $25 per month as compared with $17 per month for the latter. Mr. Riffle states that he now does business in a wider territory since acquiring the truck, and recommends their use to carpenters and builders as a means of increasing business efficiency. He has used it for 18 months with satisfaction, and his loads average from 1000 to 2000 lb.

John Denman, a Chicago carpenter-contractor, finds very useful an improvised auto truck consisting of a small body at the back of a Ford roadster. Its average cost is $4 per month, and occasions very little trouble. Mr. Denman does considerable jobbing work, storm doors and sash are made to order, and business is done in screens and weather stripping. It is an easy matter to carry such materials to and from a home and the trips can be made very quickly.



The "Reo" Motor Truck of the David Henry Building Co. of Paterson and Newark, N. J.

(To be continued)

BUILDING AGE

(Founded in 1879 by David Williams)

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Index to reading matter on page 17 of the advertising section of the paper.

DECEMBER, 1916

INDEX FOR 1916 VOLUME

Those of our readers who contemplate binding their copies of the BUILDING AGE for 1916 will be interested to know that the index for the current volume is now ready for distribution. Anyone desirous of securing a copy of the index can do so on application to this office.

THE CORRESPONDENCE DEPARTMENT

We are sure that the majority of carpenters and builders among our readers will unhesitatingly agree that the Correspondence Department is one of the most important sections of the paper, constituting as it does an excellent medium for the interchange of ideas between those practically engaged in the building business. It is always interesting for members of the trade in one part of the country to learn of the methods of doing work which prevail in other sections remote to those in which they reside, and by discussion of those methods bring out a fund of information which cannot fail to be valuable to all concerned. The aim of the Correspondence Department is to promote this interchange of ideas and to stimulate greater interest on the part of the younger element in the trade. At the same time, there is always the desire to make the department still more valuable to those for whom it is intended, but this can only be accomplished by the active co-operation of our practical readers. Those who have so generously benefited from the information obtained from volumes of the paper in the past should feel a desire to reciprocate by contributing from their personal records of experience some of the hints and suggestions which they have found valuable in their business. Every progressive carpenter and builder in the country has well-defined ideas for doing all kinds of work which he may be called upon to execute, and short descriptions of unusual or peculiar jobs cannot fail to prove highly interesting to those who perhaps have had less practical experience.

CONTRIBUTIONS INVITED

We want the younger members of the trade to ask such questions as will draw out expressions of opinion from the veterans in the business, and thus induce them to comment upon some of the many topics which constantly come up for discussion; to point out to the less experienced craftsmen wherein they can do better work or make more rapid progress by adopting methods which experience in the past has demonstrated to be in every way satisfactory. The older hands can reply to the questions of the younger members, and in this way develop an active interest in the welfare of the paper as well as in promoting the material interests of their brother chips. In this way, too, they will be rendering a good service to their fellow craftsmen in return for the benefits which they themselves derived through similar methods in the past.

We want every carpenter and builder to take advantage of the long winter evenings now at hand and each month send a few lines to the Editor dealing with some phase of building work as outlined in a general way above. His contributions will be carefully edited and published under initials only, or with his full name should he so desire. Pencil sketches will be carefully worked up to standard and the matter put into shape for publication so that no one need hesitate on these points. It is obvious that the more letters we can publish each month from our practical readers the greater will be the value of the Correspondence Department to all concerned. We hope that everyone will feel free to respond and thus do his share towards making the paper still more valuable to those in whose interests it is published.

One of the things that makes pine popular and comparatively inexpensive in mill work is that it is easier to work and easier to nail up than hardwood, consequently it finds greater favor with both machine men and carpenters.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

ENCLOSING A FRONT PORCH

From John Wavrek, Jr.—The time of year is at hand when our thoughts naturally turn, and with some dread when we consider the price of coal, to the approach of winter. Naturally we begin to think of ways and means as to the manner in which we can most effectually keep the bitter cold out of our houses. One method of doing this very satisfactorily is by enclosing the porch or veranda as some term it with sash and the scheme shown in the accompanying sketches will be found to go far in accomplishing this end.

The frame work is made of cypress 1¾ in. thick. The head piece is 1¾ x 3 in. and rabbetted ½ to ⅞ in. on the inside. The end pieces are 4 in. wide, rabbetted in the upper part for pivoted transoms and in the lower part for sash, which may be hinged if desired. This, however, is not necessary because the pivoted transoms will provide all the ventilation that may be required. The mullions are 4 in. wide outside and are also rabbetted in the same manner as the end pieces. The sill is 2½ x 4½ in. and is also rabbetted on the inside.

The top rail of the lower sash is rabbetted to fit the bottom rail of the pivoted transom. This makes a rabbetted opening which can be utilized to receive fly screens in summer, the sash being removed but the transoms left in place. It can readily be seen that this arrangement is very handy, allowing the interchanging of sash with fly screens.

It is not strictly necessary to use 1¾-in. lumber for an enclosed porch as the same effect can be produced by using 1⅜-in. stock. The 1¾-in. lumber will, however, make a much stronger and more rigid construction and is designed for the better class of houses. The glass arrangement of the sash can, of course, be made to suit the owner. Most people prefer small lights instead of large ones, as shown. This, however, does not affect the construction in general.

It will be noticed that the columns against which the uprights have to be fitted are round and there are numerous molds over which the pieces have to be fitted. This, of course, requires great care so as to make a tight job, but by hollowing out the pieces a tight joint may be obtained by inserting

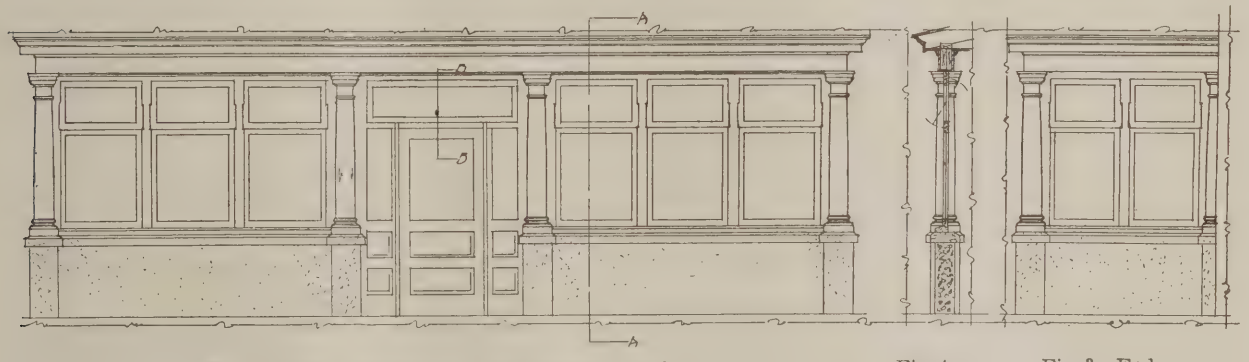


Fig. 2—Front Elevation of the Enclosed Porch

Fig. 4—Section on Line A-A

Fig. 3—End Elevation

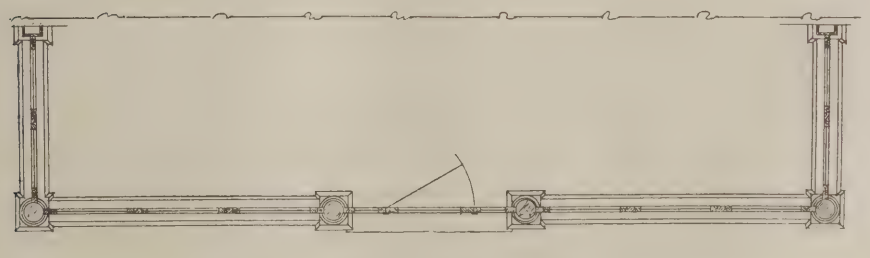


Fig. 1—Plan View of Enclosed Porch

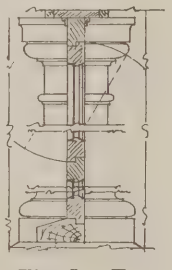


Fig. 5—Enlarged Detail on Section A-A

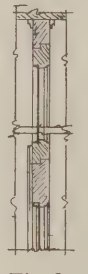


Fig. 6—Section on Line B-B

oakum before putting the stiles in place. It is a good plan to make a pattern of paste board which neatly fits over all the members and then have the pieces sawed out by a careful band sawyer. Referring to the sketches Fig. 1 represents the plan of the porch and also the arrangement of the sash. Figs. 2 and 3 show the front and end elevations respectively, while Fig. 4 is a vertical section taken on the line *A-A* of the elevation. Figs. 5 and 6 show details of construction to a somewhat larger scale than the elevations.

A porch thus enclosed will be found to greatly enhance the appearance of the house and at the same time raises the value of the property to an appreciable extent. I cheerfully recommend the treating of front porches in this manner as the owner will surely not regret spending the money, as he will be compensated in more ways than one.

OIL-MIXED CONCRETE

From Contractor, New York.—In answering the questions raised in the November issue of the paper by "O. M. R.," West Haven, Conn., I would say that I made several vessels with 5 per cent and 10 per cent of Maltha mixed with the cement and sand before the stones were added or when omitted. These vessels have been used continuously since before the article in question was written. The vessels do not become saturated nor will anything placed under them become moist, while those having no oil in the mixture saturate in a few minutes. For ordinary work from 5 per cent to 7 per cent will serve.

The mortar must be quite dry before the oil is added, as 10 quarts to the barrel makes it very mushy. A person need not worry about letting it stand a few hours before putting in place. I remixed after 30 hours' setting. It clings to a wire as firmly as it does without oil. Maltha is a Standard Oil Company product and is all ready to use. I did nothing with the samples sent me except to experiment with them. Water can be forced through iron, and of course it can be forced through any sort of concrete. For cement blocks, stucco inside and out, and for stables and poultry houses Maltha should be used, as the added expense is negligible.

APPLYING SCAGLIOLA TO CEMENT

From Ernest McCullough, Chicago, Ill.—Answering the query of "E. M. K.," East Dourington, Pa., I would say that superior scagliola, known as Marezzo, is made in slabs and put in place like marble or any released ashlar. Make a very thin paste, called "slip," of Keene's cement colored to the tint required for the veinings of the imitation marble. There will be usually several colors.

In these dishes of "slip" lay threads of suitable fiber and when they are coated lay them on sheets of glass to form the markings and veinings. Now reduce the thickness of the slip and the color of it to the color to be used for the body and pour it over the fibers. Then carefully remove the threads and the veining colors will remain. Sprinkle over the mass some dry cement to absorb the superfluous moisture.

A canvas backing is then laid on for strength and a coating of cement mortar is added to bring it to the desired thickness. When dry the slab is removed from the glass pallet and polished. The polishing is done with felt dipped in linseed oil. The felt should be made into a regular wood backed rubber for convenience in handling.

To apply scagliola to a wall surface first put on a coat of hard plaster. This plaster can be preferably of one part Portland cement to three parts of clean graded sand. For convenience in applying there can be added dry to the cement before mixing one pound of best quality hydrated lime for every twenty pounds of cement. Instead of the cement mortar coat we can use a coat of hard or patent plaster containing a fiber or hair binder.

The first coat must be thoroughly set and hard before the second coat is applied. The second coat consists of Keene's cement or plaster of Paris properly colored to imitate the marble and the veining can be produced by laying in the surface threads loaded with a thicker "slip" of the desired color. Ability to imitate marble comes with practice.

Coloring may be by means of dyes or by the use of reducible metal salts. The dyes come in the form of powders and may be obtained from all dealers in plasterers' materials and from chemical supply houses. The dry powder is mixed with the cement and the resulting color is not always uniform and it is not very lasting.

To use the metallic salts, which any chemical supply house can furnish, dissolve the salts in the mixing water. Mix a small amount of formaldehyde and an alkali with the plaster and then add the colored mixing water. The result will be a uniformly colored plaster of a most lasting kind. If parts chip off the color is not injured, as when paints are used. It is not necessary to use formaldehyde if sulphurous acid or peroxide of hydrogen can be readily obtained. The alkali, however, must be used.

Sometimes the veining is produced on the surface by cutting lines with the point of a knife blade and filling the scratches wtih coloring matter applied with a limning brush.

If the Keene's cement or plaster of Paris set too rapidly mix with 4 per cent by weight of either powdered marshmallow root, or dextrin, or gum arabic, or glue. The quantities mentioned will delay the setting about an hour. Double the quantity will cause the setting to be delayed 2 to 3 hours and makes the plaster very readily worked. It toughens it very greatly so it is readily carved and polished when set. One ounce of citric acid added to 100 lb. of plaster of Paris will delay the setting 2 to 3 hr. but does not increase the toughness.

The polishing of scagliola is done by first smoothing off the surface, if it is not cast on glass, by rubbing it with pumice stone, then with Tripoli followed with pulverized charcoal and finally by a

felt rubber dipped in linseed oil. Sometimes plates or slabs of Marezzo require polishing with the pumice stone, Tripoli and charcoal.

If the mixing and veining and fine work connected with these operations are too complicated there can be applied on top of the hard coat a second coat of hard Keene's cement or plaster of Paris mixed with glue water. After it has set perfectly it should be polished with the pumice stone, the Tripoli and the powdered charcoal but not with the felt rubber soaked in linseed oil. When the polishing is completed rub the surface clean with a rag or sponge dipped in benzine.

Use water colors with a little ox-gall or Aquoline added, and paint the surface to imitate marble. A surface painted with water colors cannot be polished. It must be varnished to present a smooth appearance, and if struck hard the surface will chip and reveal the fact that it is painted.

The foregoing sounds complicated, but so will the description of many of the common doings of skilled workmen sound complicated to amateurs. A competent plasterer following the hints here given should develop into an artist on scagliola work after considerable practice. Some men get the knack on the first job while others have to spoil many jobs before they attain proficiency.

VERANDA, PORTICO AND PORCH

From C. W. H., Pretoria, Ga.—Will some of the practical readers or the editor tell me the difference between veranda, portico and porch? In what respect do they differ in construction? Is it the size, form or locality that gives rise to the different names? In some sections I find the people calling everything in the shape of a covered entrance to a building a porch and in others a veranda. I hope some one will explain the difference and settle the matter.

Note.—The terms mentioned by our correspondent are often employed interchangeably in many sections of the country to designate the covered entrance to a building, although strictly speaking there is a difference in the form and construction by which each may be distinguished. Locality also has something to do with the use of the terms by which these portions of a dwelling are often called, "veranda" or "piazza" being common in the New England states and some other parts of the North, while in the West and certain sections of the South "porch" is the word generally employed. In some parts of the extreme South and Southwest "gallery" is the designating term, but in every section it seems to be more or less a matter of individual taste.

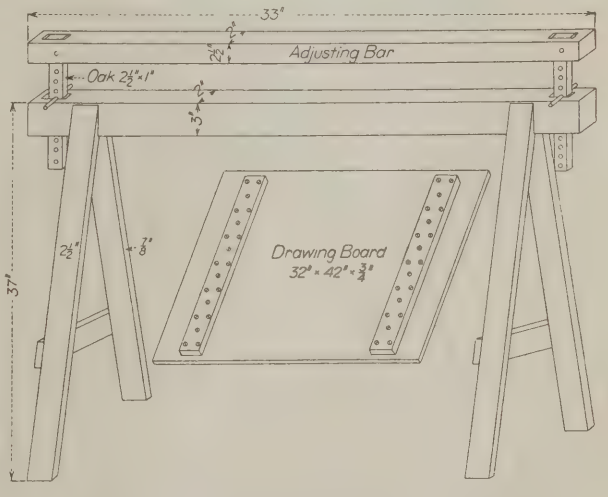
Webster's Dictionary defines "porch" as "a covered and inclosed entrance to a building, whether taken from the interior and forming a sort of vestibule within the main wall, or projecting without and having a separate roof." The same authority gives the definition of "portico" as "a colonnade at the entrance of a building."

In the one case, therefore, it is an inclosed entrance which may be just within the main wall or projecting outside, having a separate roof, and in the other it is a covered entrance having a row of columns placed at regular intervals along its front. The word "veranda" is defined by Webster as meaning "an open roofed gallery or portico adjoining a dwelling house and forming an out-of-door sitting room." A more popular idea of the meaning of the term is a covered approach to a dwelling which partially, at least, extends along two or more of its sides, while if it extends only across the front or a portion of the front it is either a porch or a portico, according to the fancy of the individual.

Our correspondent will see from the above that while porch, portico and veranda differ somewhat in construction and form, their uses are similar, and probably for this reason the terms are often interchangeably employed. The subject raised by our correspondent is a good one for discussion and we hope the readers in different sections of the country will write us concerning the local use of the terms named.

CONSTRUCTING A DRAWING BOARD

From O. B. M., New York City.—The enclosed original sketch of a drawing board may prove of interest to some of the readers of the paper, more especially in view of the discussion which occurred in these columns on the subject a short time ago. The sketch shows one of a pair of



CONSTRUCTING A DRAWING BOARD

wooden horses each 37 in. high, but with legs 33 in. long. The legs are made of ⅞-in. material 2½ in. in width. The support for the adjusting bar is a piece of 3 x 2-in. stuff mortised at the ends as shown, while the adjusting bar in cross section measures 2 x 2½ in. The pieces used for raising and lowering the adjusting bar are of oak, each measuring 2½ x 1 in. in cross section.

The drawing board is of ¾-in. material and measures 32 x 42 in. in area. It is stiffened as shown in the sketch by means of oak battens

measuring 1½ x 2½ in. The board itself is of white pine and all joints are glued.

THE NEW STYLE HEADINGS IN THE BUILDING AGE

From Hee H. See, Sacramento, Cal.—I have just bought a new pair of shoes, which is an experience familiar to all of us and not to be enlarged upon; I merely wish to mention the fact that I got into quite a heated argument with the storekeeper because he could not supply me with the same style of shoe I was wearing and which I had bought at his place only a few months before. His best excuse was that he had to keep his stock up-to-date and that particular shoe had gone out of style.

It is probable I would have forgotten all about this if I had not that same evening picked up the BUILDING AGE and noticed the paragraph announcing the change of address and mentioning typographical changes, made and to be made in the paper. My thoughts at once returned to the storekeeper who thought I ought to change the shape of my feet every three or four months in order that he might keep his stock up-to-date, and I began to consider how much money is spent every year, in every line of business, merely for the sake of keeping up-to-date.

I suppose there was a good reason for changing the headings of the articles in the BUILDING AGE, and no doubt someone gave his attention to the matter for a considerable period. Personally, however, I prefer the headings as they were in the September and previous issues.

It would be interesting to know what percentage of the readers noticed that there had been any change, and of this percentage how many of them thought it a change for the better.

I imagine that most of us read the paper because of the authentic knowledge we find in its columns, and if that is as good in the future as it has been in years past, not many of us are going to worry about the headings or make-up.

That is the way I feel about it now, but no doubt if the paper ever did come out in its shirtsleeves or in any other slipshod style of dress, I'd be one of the first to register a "kick."

REMOVING CONCRETE COVERING OF A WOODEN FLOOR

From H. R. T., Peoria, Ill.—Supplementing the statement of the difficulty which I experienced with the "sweating" of a concrete covered floor and which appeared on page 56 of the November issue of the BUILDING AGE, I am sending some particulars of the means which we employed to remove the concrete covering. It will be recalled that the cement floors were laid over a rough flooring and it caused me a great deal of trouble from the moisture which collected on them.

Having secured permission of the owner to tear up these floors and replace them with oak floors, the first thing we did was to obtain several broken automobile springs. After chipping out a hole we were able to drive the springs under the cement and by tapping upon it we could spring the concrete just enough to crack it so that we could lift it and the pieces would not fly about and damage the mop board and walls. It was of course necessary to secure springs with considerable bow in them. We found that the springs did such little damage to the rough flooring that we laid the oak floor on it, while in the case of the rooms where we were obliged to use picks and chisels it was necessary to lay an entire new subflooring.

I might add that where the springs were used in taking out old floors we did the work and laid the new hardwood floors without asking the tenants to vacate the premises.

WEDGING A HAUNCHED TENON

From E. G. E., Mt. Vernon, New York.—The query presented by "W. H. C." of Peoria is an interesting one, and the following solution of this problem will, I think, meet the requirements of the case.

By finding how the wedges affect the tenon, we can deduce the better method. Let us take his Fig. 2 first. When the upper wedge is driven in it forces the wood above it up against the mortise and the wood below the wedge is forced down against the mortise. The lower wedge acts in the same way, adding its thrust to the upper wedge and down to the mortise. The wood displaced by the wedges will so swell the tenon that the friction of the tenon against the mortise will hold the joint secure. But there is great danger of the tenon splitting sooner or later and therefore the joint, as a whole, is weak. Any carpenter knows how he can split his wood by a wedge and he can see that this is what he is doing to the tenon when constructing the joint as shown in Fig. 2.

Now let us see how his Fig. 1 works. The upper wedge presses up against the mortise and down against the tenon, perhaps crushing the wood. The lower wedge, as it is driven in, pushes the tenon up and also forces itself against the mortise. Thus the joint is held secure by the friction of the mortise and tenon against the wedges. There being four friction surfaces instead of the two shown in Fig. 2, there is more tendency for the tenon to slip, although it is amply secure. But it will be seen that there is no danger of splitting the tenon, as there is in Fig. 2.

A careful reading of this explanation will show that the friction between the mortise and tenon is greater in Fig. 2 than in Fig. 1, but the weakening of the tenon in Fig. 2 makes the joint an unsafe one, therefore Fig. 1 is the better joint.

A miniature "open-air" school is being built by students of the St. Paul (Minn.) Industrial School under the direction of the manual training teacher. A concrete foundation wall, cast iron columns to support the roof, and removable canvas walls contribute to form a realistic model.

ARRANGEMENT OF SLIDING GARAGE DOORS

THOSE OF THE SLIDING-FOLDING TYPE CONSIDERED AT THIS TIME—VARIOUS DETAILS

By E. J. G. Phillips

THE private garage is one of the comparativly new buildings which has come into existence, and with its coming has brought new problems to be solved. Its style must be in keeping with the automobile to be housed and its architecture should harmonize with the residence to which it belongs. Plenty of room for the car and a liberal allowance of space to work around it must all be provided without making the building unduly large or occupying more than the frequently limited amount of ground space. The doors must occupy the greater part of one side of the building and a place must be found for them when the doorway is to be opened. Without doubt, the doors should be inside of the building, but very little space inside of the garage can be appropriated for use in the movement of the doors. It is the problems arising in connection with the door question that will be dealt with in the following paragraphs. Several general types of doors designed especially for garages will be shown and the various applications will be described. Although this article refers chiefly to private garages, a number of the plans suggested are also suitable for public garages.



Fig. 1—Five Sliding Door Openings



Fig. 2—The Doors Shown Nearly Open

The colonial brick garage shown in Figs. 1 and 2 illustrates a comparatively new type of garage door, the general feature of which is the use of a number of narrow doors hinged together in two sections and folding toward the sides of the opening. The illustrations show an opening closed by five doors, but the idea is not limited to this number of doors. Three, four, five or six doors per opening will meet all requirements. These doors fold inside of the building, but being narrow, do not require a great deal of space in which to operate. The second door from the jamb is always supported and guided by a hanger sliding in a trolley track. This feature also gives positive control of the doors. As may be noticed from the plans, the doors fit flush in the door frame and the joints between the doors are rabbetted so that a very tight job is the result.

All the doors should be made the same width over all and the rabbets should be arranged exactly as shown on the plans. A door stop is fitted around the sides and top of the opening.

Locate the center of the hangers 2¾ in. from the edge of the door on four door openings, but for three, five or six door openings the hanger apron should be set flush with the edge of the door. The top of the hanger apron may be set in line with the top of the door on three or four door openings, but on five or six door openings, it should be set about 2¼ in. above the top of the door, as in Fig. 4. The end of the track over the hanger when the doors are closed is set close to the wall, but the outer end is supported at varying distances from the wall by adjustable track brackets, the distance from the wall depending upon the position in which the doors stand when open. The end and intermediate brackets are shown in Fig. 7, and attention should also be directed to the vertical adjustment by which the track can be carefully leveled so the hanger will rest in the track at all positions without unduly straining the hinge fastenings. The plans show the doors standing at different angles, depending upon the wall space adjoining the opening in the different plans. Any angle or position of the doors may be obtained by adjusting the outer end of the tracks away from or toward the wall. The doors are locked by top and bottom bolts, adjustable for varying heights of doors.

The plans and interior elevations, Figs. 3 to 6, show the necessary hardware for trimming three, four, five or six door openings. In the three door opening, Fig. 3, two doors are hinged together and fold toward the right. The third door is hinged

to the opposite jamb and is used as a passage or entrance door. This is particularly adapted to a small garage with an 8-ft. opening and no other entrance. Two doors fold toward each side in Fig. 4. The four door openings should only be used when there is another entrance, but the three, five or six door openings all have one passage or service door to be used in walking in or out, thus making it unnecessary to open a large door or a number of doors. The passage doors are locked with regular cylinder locks.

Three doors fold toward one side and two toward the other side in Fig. 5. This is similar to that used on the garage shown in Figs. 1 and 2. The center door in this case is the passage door. The door to which it is hinged is held rigidly in place by the top and bottom bolts, the floor guide and the hanger.

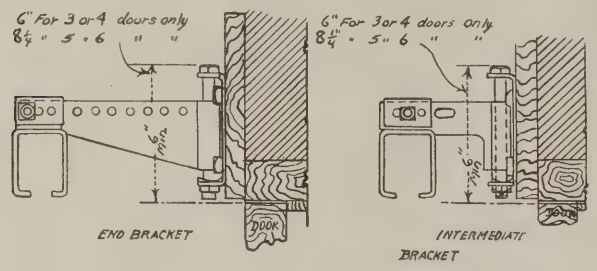


Fig. 7—Details of the End and Intermediate Brackets

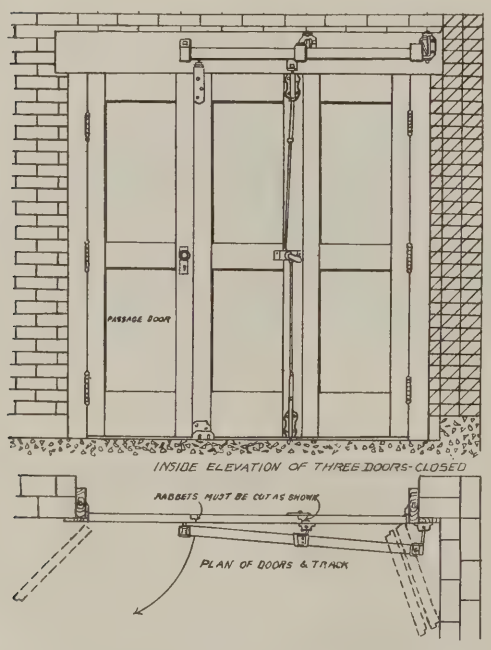


Fig. 3—Inside Elevation of Three Doors Showing the Hardware

As noted previously, these illustrations show the heights at which the hangers are located on the doors for different combinations. The minimum headroom is 6 in. for three or four doors and 8¼ in. for five or six doors. The doors should not exceed 3 ft. in width. When three doors fold to one side, as in the five or six door openings, the tie rod or brace will assist in supporting the doors and keep them from sagging and dragging on the floor.

(To be continued)

THE HOLDING POWER OF NAILS

The holding power of nails in wood, and especially in hard woods, has not received a great deal of attention. The nailing of soft woods, such as pine, is supposed to come to people like walking, with all the proportions of length and thickness of nail for the size of wood to be put together. The

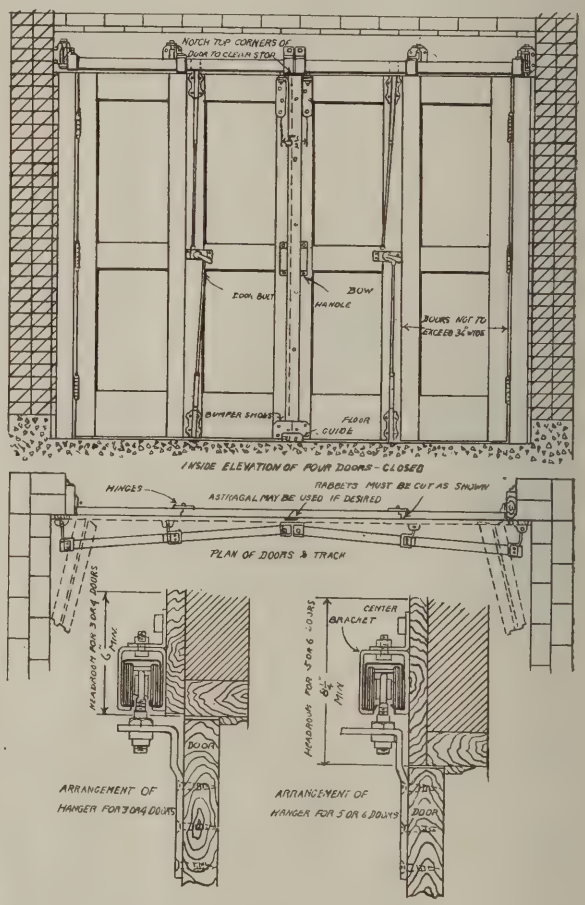


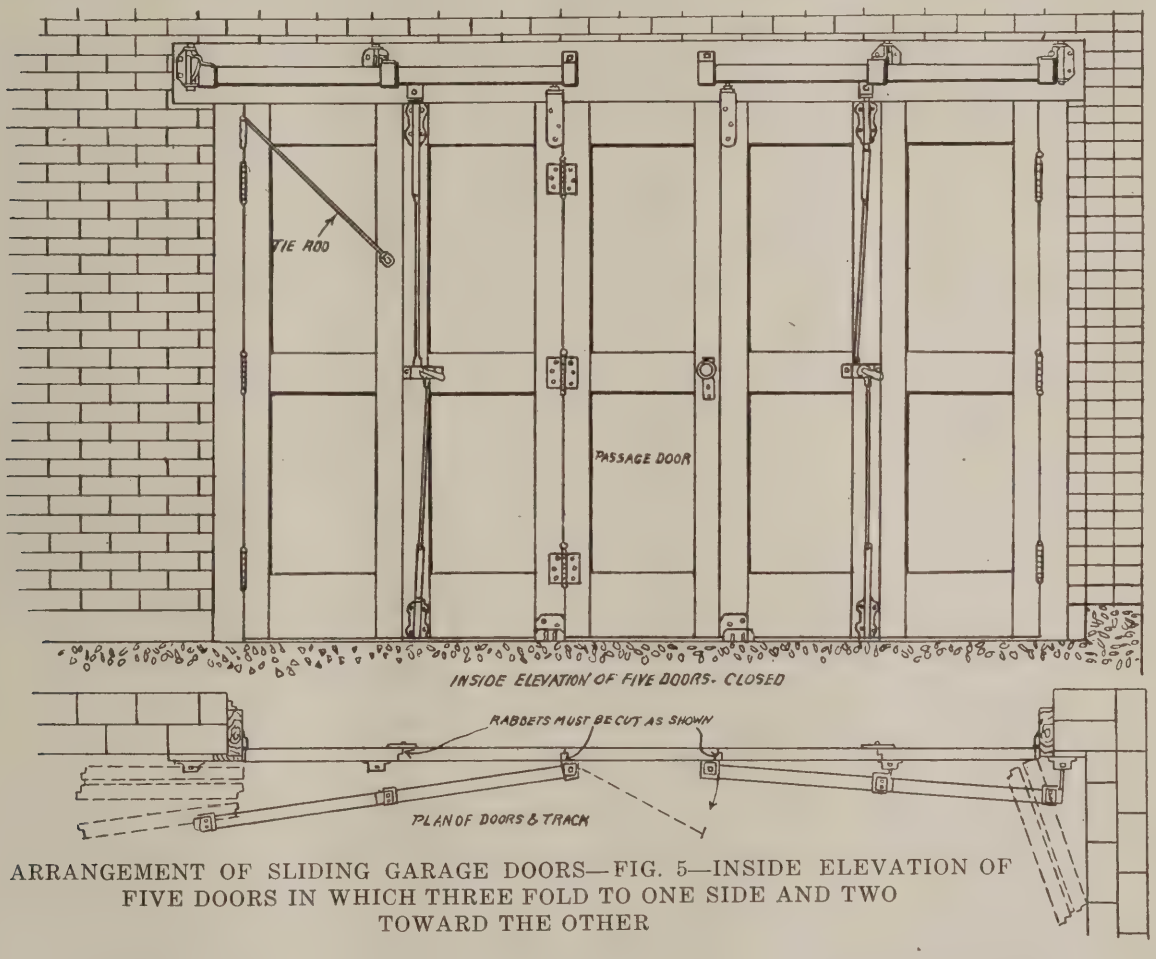
Fig. 4—Inside Elevation of Four Doors with Details of Hanger Arrangement

The use of the passage door is clearly shown in Fig. 1. In Fig. 6 three doors fold toward each side. The door to which the passage door locks in the center of the opening is held securely in place by the top and bottom bolt. This arrangement provides for openings as wide as 18 ft., which covers the range of ordinary requirements. The cross-sections at the bottom of Fig. 4 show the hanger attached to a cased opening and also to an opening which is faced flush with the inside walls.

nailing of hard woods is not so common, as hard woods are often framed or bolted together. The subject seems to have had the minimum of study, for it is hard to discover the reasons that determine the size of nails or screws among wood-workers. A glance at the interior of any coasting boat will show that although every nail is clinched, a length of 3 in. is allowed for that purpose, while the spread of the head barely amounts to 1 in. The waste of iron in nails alone cannot be less than

from 20 to 25 per cent. Hard woods are more common in tropical than in temperate countries, and as they are frequently joined with nails, some system should be adopted to obtain the best results. It is useless to ask the carpenter to go into calculations about nails; he cannot do it, but he can make a simple experiment that will enable him to avoid splitting the wood.

A nail holds itself in place in two ways: by friction of its sides against the wood, and when clinched, by the resistance of the clinch which resembles a second but smaller head. The combined resistance of sides and clinch represent the total holding power of the nail. Square nails are usually tapered on two sides and parallel on the other two; the tapered sides should bear against the end



ARRANGEMENT OF SLIDING GARAGE DOORS—FIG. 5—INSIDE ELEVATION OF FIVE DOORS IN WHICH THREE FOLD TO ONE SIDE AND TWO TOWARD THE OTHER

grain of the wood, crushing it gradually as the nail enters; and when it is fully driven it bears uniformly against this end grain, crushing it without splitting. All woods when soaked in water or when green may be nailed with less risk of splitting than when they are dry, but there are limits to the depth that a long nail may be driven into any wood before it begins to bend, that is to say, where the friction of the wood overcomes the driving power of the hammer. When a nail begins to bend it shows that a hole must be made beforehand; and the size of the hole is a matter of some importance, says a writer in the *Indian Textile Journal.* Its object is to reduce the friction so as to allow the nail to be driven without bending, but if made too large, the holding power of the nail will be reduced and clinching will be a very imperfect remedy. If many nails of one size have to be driven, as in boat building, it is advisable to experiment on a piece of wood of the necessary thickness in order to find out the right size of the hole that will avoid splitting the wood, or bending the nail. When wire nails of a large size are used in drilled holes, the size of the hole should be such as will insure a good fit; and if the nail it to be clinched it should be softened at the point by heating to redness. The wire nail is hard drawn to enable it to be driven without bending in soft woods, but it does not clinch well for this reason, and therefore needs softening.

The holding power of nails and screws may be ascertained by a simple experiment. The nail may be driven into an upright post leaving the head projecting just enough to be seized by a nail-puller. This instrument is then attached and weights added to the outer end until the nail begins to move. A bag loaded with stones will serve the purpose. The nail-puller consists of two levers formed by the extended handle and the projecting foot, and if the weight in the bag is multiplied into the length of the handle in inches and divided by the exact length of the foot, measured from the nail to the point of contact of the foot with the post, the result will be the holding power in pounds of the nail.

Nails that have rusted after being driven have an increased holding power, but if rusted before use they tend to make a slightly larger hole than a

smooth nail, because of their rougher surface. In cases where clinching would be liable to split the wood, nails may be cut and riveted over a small washer. This makes a strong and durable joint. There is also a way of clinching a nail within the wood that is at times useful. The point is filed away on one side to a wedge shape and then bent over the filed part until the point is level with the side of the nail. A hole is drilled to the size of the nail which is inserted with the filed surface parallel with the grain of the wood. When driven, the point takes the form of a hook and has a strong hold upon the wood. The point of this nail should be heated and softened so as to facilitate the turning of the point.

Nails driven in wood that is exposed to alternate wetting and drying are liable in time to work loose. The wetting swells the wood and increases its dimensions across the grain, and as the nail is inelastic it is moved, a space forming at the point equal to the amount of swelling of the wood. When the timber dries the nail does not return to its original place, and if tapered it tends to move outward each time that the wood is wet and dried. For this reason wood structures bolted together and exposed to the weather require occasional screwing up.

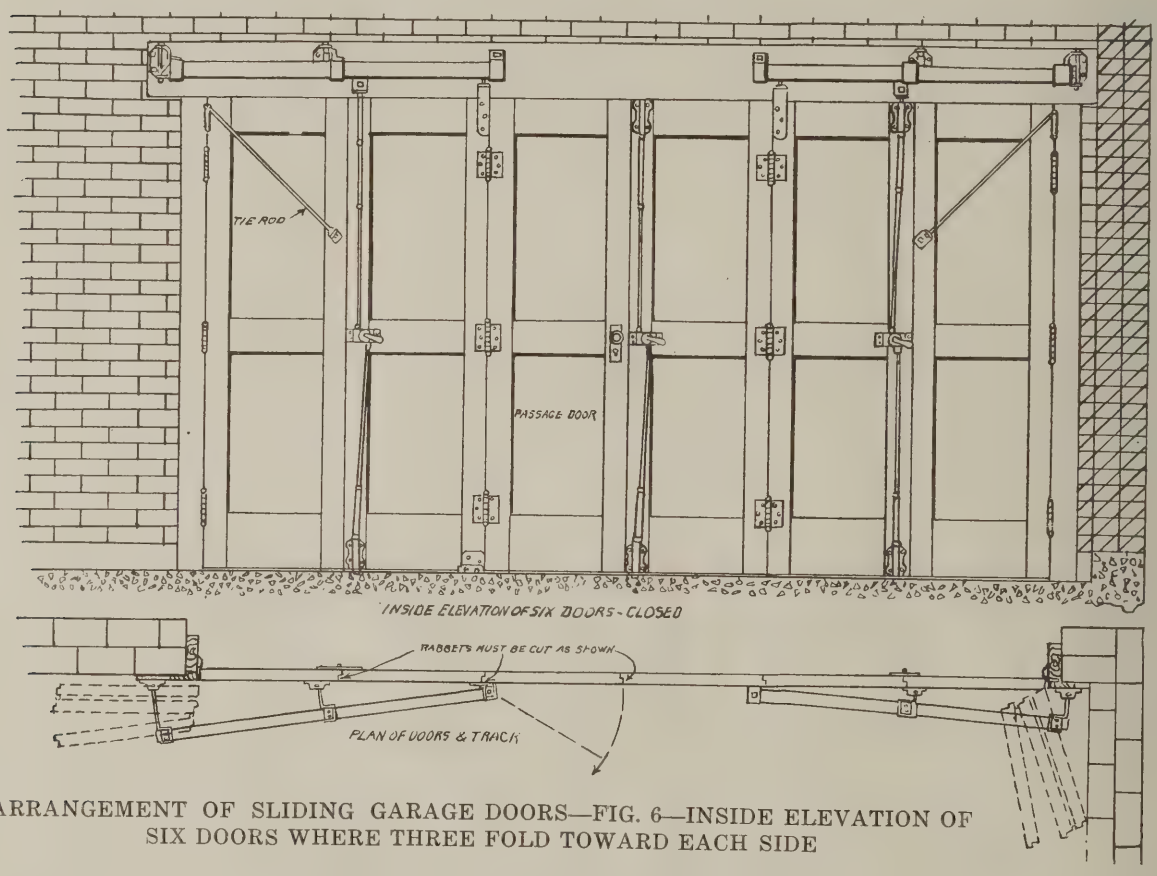
Screws offer an even more interesting subject for experiment, for it will be often found that if the hole for a screw is carelessly drilled it has less holding power than a nail. The holes for screws in hard wood should be very carefully made in two sizes: for the neck and the screw respectively; and the point of the screw-driver should be of the shape of the notch in the screw, and not a chisel point as is usually seen.

ESTIMATING AREAS FOR PLASTERING

In discussing how to estimate the combined areas of walls to be plastered, a builder suggests the following method:

Put down in two columns the lengths of the two sides of the rooms to be figured that have the same ceiling height. Add each column and multiply the totals by two for the four sides of the rooms; then multiply each by the ceiling height; this gives the square feet in walls.

Extend a third column from the other two by multiplying the two sides of each room together, which when added, gives the square feet in the ceiling. Add the three totals together and divide by nine for the square yards in the job. Rooms having wainscoting and high base are figured separately.



ARRANGEMENT OF SLIDING GARAGE DOORS—FIG. 6—INSIDE ELEVATION OF SIX DOORS WHERE THREE FOLD TOWARD EACH SIDE

Many architects have made a feature of level roofs used as porches and outdoor living rooms and we understand that the Portland Cement Association of 111 West Washington Street, Chicago, Ill., is offering compensation for good photographs of roofs thus utilized. The roofs are not limited to buildings of any special material, the desire being to know what has been done to make a roof a useful and an attractive feature of modern homes.

THE GREAT AMBITION OF OUR BOYHOOD

A FEW THOUGHTS SUGGESTED TO OUR YOUNG MIND BY THE WORK OF THE BUILDER

By W. Livingston Larned

EVER since I can remember
I've wanted to be a Contractor,
And put up houses
And bridges and things,
And be able to say
Exactly what I thought
To brick masons.
As a kid,
It was my pet ambition.
I looked with awe
Upon Mr. Jones,
The stout, red-faced
Old Gentleman,
Who put up all the houses
Of any consequence
In Our Town.

* * *

I never could understand,
In my Youth,
How that astute gentleman
Could carry all those figures
Around in his head.
It was somethin' awful
To even think about,
When nine times seven
Was so deuced difficult.
Yes, sir,
He'd take
Just a plain piece of ground,
With nothing on it
But dirt
And some sand fleas
And then—
Then he'd commence to dig,
And piles of brick would pop up
And gravel,
And a white box
For mixin' stuff in,
And before you knew it
The bricks would be
In the holes
And another house
Was sprouting
In Our Town.

* * *

I recall distinctly
How I was impressed
By the little yaller shack,
Those carpenters built
On the outskirts
Of the lot.
It was
A Treasure Trove
Of wonder-things—
Kegs of nails,
And shingles,
And boxes of tools,
And paint—oh-e-e-e—
Blue and green and red paint,
With brushes you could
Dip in it with.
Then there was a row of linseed oil cans
And a sticky black bottle
Filled with turpentine.
Beneath this one
Meager roof
No Pirate Chief
Ever hoarded
So much gold.
On Sundays,
When the watchman was asleep,
Us boys
Would silently raise a sash
And climb in,
And my heart
Would well-nigh stop beating,
I was so happy.

* * *

We'd dip
Th' brushes
In the cans of paint,
And we'd swipe nails—
Six of every different size—
And we'd pray,
There in the gray, half-light,
That some good fairy,
Would come along,
And turn us into carpenters,
So's we could have
ALL th' nails,
And do nothing
But drive them,
All day long.

* * *

That was long ago.
Still,
The feeling concerning
The Contracting business
Is about the same.
I'd swop
My office job
Any day
For one like Mr. Jones'.
It isn't the money—
For I've heard,
Indirectly,
That contractors *DO* make
A little profit,
And it isn't the glory,

Or anything of *THAT* sort,
It's just the Boyhood joy
Of putterin' around
Paint kegs,
And white lead,
And shingle nails,
And lathes,
And musty old boxes
Of sinister tools.
That's it—
Th' love of little things.
Maybe
There's some of the magpie
In me.
Isn't that
The bird
That steals things
And takes 'em
To its nest?
Anyway—
I want to be a carpenter,
And if there's
Such a thing
As being born over again,
I'd like to put in my request now
For the Contractor thing.
Think of it—
Think of the mad joy,
Of not running true to form,
And buildin' a little home
EXACTLY
As some
Young married couple
Really *WANTED* it.

THE PREVAILING FALLACY OF "FREE" PLANS

WHY THE PROSPECTIVE OWNER THINKS HE IS RECEIVING "SOMETHING FOR NOTHING"

By Noble Foster Hoggson*

WHEN, after many mental flights of enthusiastic exhilaration, a man makes up his mind definitely to proceed with a building operation, the first thing he thinks of is the matter of planning. He knows pretty well what he wants. He has been contemplating the project for a considerable length of time; he has the site and a certain sum of money which he expects to put into the operation. All preliminaries have been decided. He prepares to go shopping.

He has heard of "free" plans. Some one has told him that, by having several sets of sketches made by different architects, he may determine which architect displays the ability to best carry out his ideas and desires. So he gets in touch with a number of architects. He frankly tells each of them that it is a matter of competition, and that the plans which seem to suit his needs best will be selected; that only the winner of the competition will be paid for his work.

ONLY ONE CAN WIN

Only one of these architects has a chance to secure the commission for the proposed building operation. One of them will win; all the others will lose; and, strange as it may seem, the owner has obtained nothing "free."

The owner spoken of above, who thought he had received something for nothing, was like most people laboring under that impression—he had not. Free plans are not free. When the successful architect in this little competition was awarded the commission, the owner assumed the cost to which all of the losers had been put. How? Because through the practice of competition the successful architect in this competition is possibly the unsuccessful member in many other competitions. In other words, the architect receives only one contract in several attempts. It costs him just as much to prepare the drawings for each of the unsuccessful attempts as it cost to prepare the drawings for which he is paid. Therefore the order he obtains must bear the cost of those he does not get. The owner, in the building operation the architect secures, pays a proportionate cost of all the jobs upon which the architect has spent his energy.

OWNER SHOULD PAY FOR ONE SET OF PLANS

An owner should pay for one set of plans—his own. Every person who has the desire to build is inspired by an ideal. It is his sincere wish to build enduringly and to attain harmony in building. He begins with the intention of having his building operations conducted successfully, satisfactorily, speedily, and economically. To obtain this result, building problems should be considered as a whole. The plans are a very important matter, but no more so than the other elements that enter later. If the plans are satisfactory, seeming to express the ideas of the owner and serving their purpose adequately, an important question to be answered is whether the intended structure can be erected for the amount that has been set aside for this purpose. And will that amount include the equipment, the furnishings and the decoration? If not, what additional amount will have to be added? Then is the time to decide these matters. The architectural part of any structure is the fixed, dominating element that controls everything else, the element to which everything else must conform. Once settled upon, it cannot be radically changed except at a great expense, and even then, only within certain limits.

*President, Hoggson Brothers, Builders.

A TILE AND STUCCO HOUSE IN WORCESTER

AN ARRANGEMENT OF ROOMS INVOLVING INTERESTING FEATURES—DETAILS OF CONSTRUCTION WORK

THE rapidly growing tendency toward fireproof construction in connection with dwelling houses is exemplified in the many structures of this nature which are being erected year by year in all parts of the country. An excellent example of this tendency is found in the tile and stucco-coated residence which forms the basis of the present article. The half-tone picture on this page affords the reader an excellent idea of the appearance of the completed building while the other interior views give an idea of the finish of some of the principal rooms. The floor plans clearly indicate the general layout of the rooms and present a study in planning which the builder and prospective house owner will find of more than usual interest.



TILE AND STUCCO RESIDENCE OF MR. F. T. BLAKE AT WORCESTER, MASS.—ARCHITECTS L. W. BRIGGS CO., OF THAT CITY

According to the specifications of the architects, the foundation walls are of field stone laid in a 1:3 mixture of cement mortar to which 10 per cent of lime was added. The joints in the wall above grade are raked out and pointed with white Portland cement.

The main walls of the house are of 8-in. terra cotta blocks having special dovetail scoring to serve as a key for the outside stucco, which is also a 1:3 mixture of Portland cement mortar. Where necessary Rutty metal wall plugs were built in to serve as grounds for nailing strips.

Terra cotta slabs 1 in. thick are set under all floor beams to serve as bearing plates. Steel plates not less than 8 x 12 x ¾ in: are used under the ends of all beams resting on masonry walls.

Embedded at intervals of 5 ft. in the wall under the roof plate are ¾-in. bolts 30 in. long and projecting 6 in. above the top of the wall for the

purpose of securely anchoring the roof plates.

The plates are 2 x 8 in., the wall and partition studs 2 x 4 in. placed 16 in. on centers, and the girders are flush with the floor joists and have 2 x 3-in. bearing pieces spiked to the sides. All floor joists are bridged with 1 x 3-in. strips and bearing partitions are bridged once in the height of each story with 2 x 4-in. pieces. Where cement wainscots occur extra studding are placed so as to make 12-in. bearings for metal lath.

Studs are doubled at all openings and the latter are trussed overhead where necessary. Where bearing partitions occur over each other, the cap of the lower partition forms the sill of the one above. Fire stops are cut in between the joists at all floors and partitions and between stair stringers as required by the building ordinances of the city.

The exterior tile walls of the house, including reveals and soffits of openings, the ceilings of open porches, as well as the cheeks of porches and dormers are covered with stucco. The ceilings and cheeks of porches are furred with a ⅜-in. steel rod stapled to the face of the boarding on the cheeks and furrings on the ceilings and covered with No. 24 gage "Hampton" iron metal lath securely wired to the steel rods with heavy galvanized iron wire. The stucco was applied in three coats, the first consisting of one part Portland cement and three parts sand with not more than 10 per cent of lime putty. The stucco on metal lath had hair mixed with the lime putty in the proportion of 4 lb. of the former to 1 bbl. of the latter. The second coat consisted of one part Portland cement to 2½ parts sand, while a final coat consisted of one part Medusa white Portland cement and two parts white sand. The final coat of stucco was mixed with Medusa waterproofing applied in strict accordance with the directions of the manufacturers, the Sandusky Cement Company, Cleveland, Ohio.

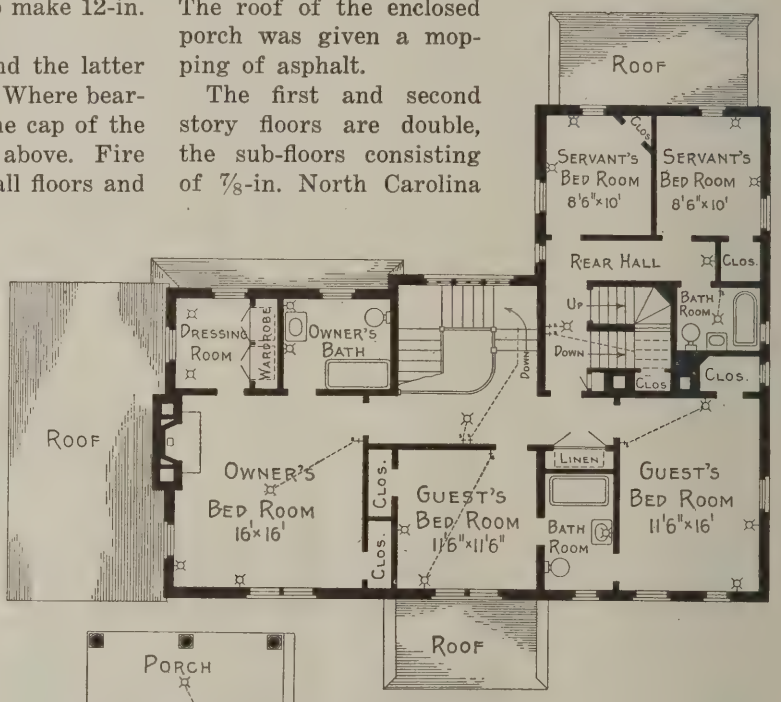
All pitch roofs are covered with sheatihing boards over which was placed one thickness of asphalt felt and over this in turn was laid unfading mottled green and purple slate 3/16 in. thick with 3-in. head lap. All valleys were laid open and lined with 16-oz. copper 20 in wide. The roof of the enclosed porch was given a mopping of asphalt.

The first and second story floors are double, the sub-floors consisting of ⅞-in. North Carolina pine laid diagonally and covered with 2-ply building felt. The finish floors are 13/16 x 2¼-in. face red birch, except in the kitchen, pantries and entry, where they consist of narrow strips of spruce smoothed for linoleum. The rear staircase hall and the service portion of the second story have finish floors of maple. The attic floor is of ⅞-in. No. 2 spruce.

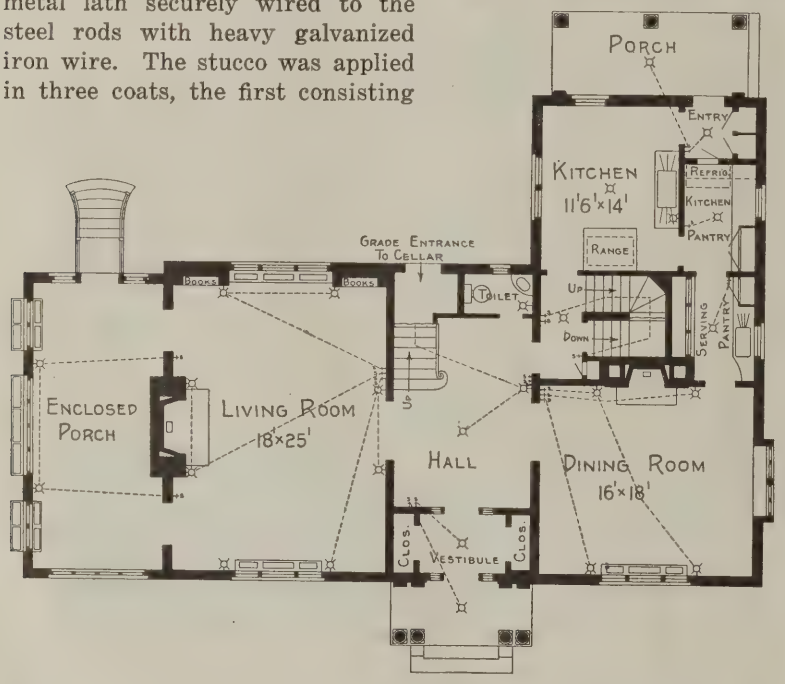
The service portion in both stories of the house as well as the laundry, cellar and attic stairs are finished in North Carolina pine, the service portion having received one coat of primer and filler and two coats of varnish left in the luster.

The finish in the living room is Gulf cypress, while that in all other rooms is birch painted. The dining-room has a wainscot with molded base and cap and flush molded and raised five-ply panels.

The stairs are built on 2 x 10-in. stringers placed 12 in. on centers. The main stairs have 1⅛-in. treads of red birch and risers ⅞ in. The landings are made to match the floors. The handrail is of red birch with spiral at the bottom supported on a turned post. The turned balusters are 1¾-in. birch



Second Floor Plan—Scale 1/16 In. to the Foot



Main Floor Plan—Scale 1/16 In. to the Foot

with two to each tread. The angle posts are square with panel shafts and molded caps and drops.

In the living-room the wainscoting is of wood 5 ft. 6 in. high and in the dining room 3 ft. high. In the owner's and guests' bath rooms it is of tile 4 ft. 6 in. high and in the kitchen, pantries and entry it is of cement about 3 ft. high applied to "Clinton" galvanized iron lath.

Some of the built-in features include clothes chute, lined with ½-in. thick sheathing and having ⅞-in. panel doors about 18 in. high; wardrobe in the dressing room which has drawers at the bottom, and recessed bookcases which have movable shelves.

The owners and guests' bath rooms have Herringbone ceramic tile floors with joints of white Portland cement and 8 x 6-in. glazed tile wainscot with 6-in. sanitary tile base and 2-in. cap.

In the cellar is a No. 6 "Hoffman" instantaneous gas water heater with thermostatic automatic regulator.

The cellar is of concrete 3 in. thick and is finished with a coat ½ in. thick, consisting of a mixture made up of one part Portland cement and two parts sand, laid before the base course set.

The outside trim is of Gulf cypress with the front entrance door frame of Western white pine. The porch columns are of white pine made by the Hartmann-Sanders Company, Chicago, Ill. The entrance porch is paved with "Harvard" brick laid in Portland cement.

The inclosed porch has plastered walls and the trim is quarter-sawed white oak. The ceiling is sheathed with ⅞ x 5½-in. face shiplap boards and has a cornice 3¼ in. wide. The jambs of the windows in the porch are plastered, and the frames cased with ½-in. plain piece and a small bead. The front of the inclosures of the porch have hinged wood lattice grilles.

The house here described was erected for Fordyce T. Blake on Military Road, Worcester, Mass., in accordance with plans and specifications prepared by L. W. Briggs Company, architects, of that city.



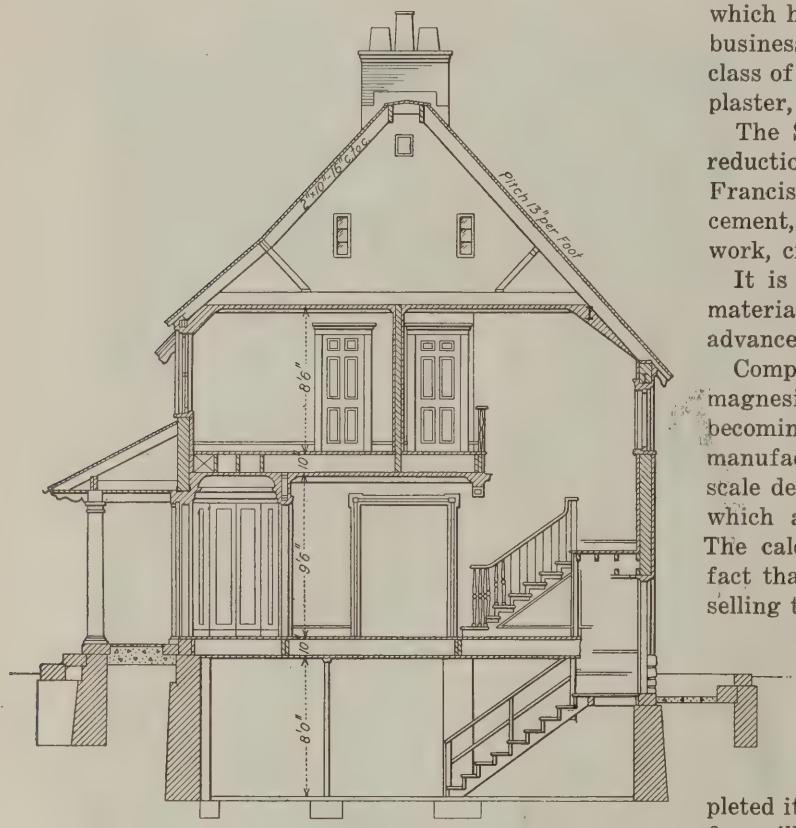
VIEW IN THE LIVING ROOM LOOKING TOWARD THE REAR OF THE HOUSE

SAN FRANCISCO MATERIAL MARKET

Our correspondent, writing under date of Nov. 7, says: San Francisco was rather well built up in anticipation of the Exposition last year, and thus far there has been no scarcity of accommodations, either as to business space or down-town or suburban living quarters. There has been a great deal of building planned during the last year, and most of the plans would no doubt have been carried out, were it not for the extreme cost of materials, which has stopped speculative building almost entirely, and

materially retarded ordinary dwelling construction. Small work, however, has been comparatively active of late, especially for business buildings of moderate size in the wholesale districts, and many mechanics still find employment in the construction of factory buildings in Oakland, Alameda and Richmond, as well as in San Francisco.

The price of structural steel has a decidedly deterrent effect, especially as to large buildings in which it is an important item. Besides the high price, deliveries are very poor, and several jobs of importance have been held up at great inconvenience



VERTICAL SECTION THROUGH VESTIBULE AND MAIN HALL TAKEN ON A LINE JUST TO THE RIGHT OF THE STAIRS— SCALE, 3/32 IN. TO THE FOOT

on this account. Local steel shops, however, are now fairly busy on small work and no longer suffer much inconvenience because of the strike. Reinforced concrete has been largely used for factory buildings, but less in other lines. The reinforcing bar market shows less strength than was expected, as plans for many concrete bridges, which would have taken a large tonnage, have been held up. This class of material, however, finds an enormous demand in the Orient, and the local mills are finding an outlet for their surplus at high prices.

Despite the further advance of corrugated iron, the demand was quite active for a time last month, owing to the hasty construction of a number of large mining buildings of this material in Nevada, San Francisco stocks being drawn upon for the sake of prompt delivery. This material is also being used for a number of industrial buildings here.

With winter approaching, the demand for lumber is quieting down somewhat here, while shortage of cars and ships prevents the normal shipments to eastern and foreign markets. Prices hold fairly steady on all kinds of lumber. The freight on lumber by boat to San Francisco from Oregon and Washington ports is about $6 per M., nearly twice the normal cost.

Brick prices remain steady and it looks as if the year will end with an unusually small surplus at the kilns tributary to San Francisco, most of which have had a full run all season. This is attributed largely to the effective campaign in favor of brick, which has gained this material more popularity for business buildings, and especially for the better class of homes. The situation in cement, sand, lime, plaster, etc., shows no particular change.

The Southern Pacific Railroad has announced a reduction in transcontinental freight rates to San Francisco, beginning Nov. 24, affecting brick and cement, iron and steel forms and molds for concrete work, crude and calcined magnesite, etc.

It is announced that, beginning Jan. 1 building material teamsters in San Francisco will get an advance from $3 to $3.50 per day.

Compositions for flooring, etc., in which calcined magnesite and oil are the principal ingredients, are becoming quite popular in California, and their manufacture is encouraged by the present large-scale development of California magnesite deposits, which are very large and of exceptional purity. The calcined material is also made cheap by the fact that several concerns engaged in calcining are selling the resulting carbonic gas for enough to pay the cost of calcining and leave a profit.

Plans long under way for the systematic exploitation in export markets of the Douglas fir lumber of Oregon and Washington are now taking shape. The Douglas Fir Export & Exploitation Company has completed its organization, with the backing of seventy-five mills doing an export business, representing an output of about 200,000,000 board feet of lumber annually. It is expected that the bulk of the export lumber business of Oregon and Washington will be handled through this concern, which is completing plans for the establishment of agencies and the inauguration of a great educational campaign at the principal foreign ports to which Pacific Coast lumber can be shipped.

SUMMER SCHOOLS AND MUNICIPAL CAMPS IN NATIONAL FORESTS

An increasing use of the National Forests for municipal camp sites and summer-school locations is reported by the Forest Service. Officials say that the National Forests offer unlimited opportunities along these lines besides the excellent opportunities for healthful recreation that the forests afford. Ample provision is made for campers and tourists, hunting and fishing in season being allowed. There are no restrictive regulations beyond those regarding forest fires.

Among the cities which have availed themselves

of the facilities afforded is Fresno, Cal., which has been granted a permit for the use of a 15-acre camp on the shores of Huntington Lake, in the Sierra National Forest. It is reported that the city will establish a camp in which outings during the summer months will be provided at low cost for 11,000 school children and their parents.

In the same forest a California State normal school is now occupying a tract of land which is rented from the Government under a long-term lease. A number of buildings have been erected, all of which, as well as many cottages and camps, are supplied with water from a water system installed by the Forest Service. In connection with the regular six weeks' summer course this school gives a course in woodcraft and general forestry subjects. The students visit the near-by Forest Service ranger station and lookout towers, and study the Government's methods of fire protection. Addresses on the work of the Forest Service are given by officials from time to time.

The Georgia State Forest School has a camp on private lands on the Georgia National Forest, where a summer course is given. A feature of this course is a series of talks given by members of the Forest Service stationed in the vicinity.

Los Angeles was the first city in California to establish a vacation camp in the National Forests. A tract of land in the Angeles Forest has been rented and a large camp built at a cost of about $8,000. This camp consists of a log and stone lodge, 46 furnished cottages, tennis and croquet courts, baseball grounds and handball courts.



THE DINING ROOM LOOKING TOWARD THE OPEN FIREPLACE, WITH THE DOOR TO THE SERVICE PANTRY JUST BEYOND

LIEN LAW FOR PORTLAND

A joint committee from The Builders' Exchange, Building Material Dealers' Association, Central Labor Council, Planing Mill Owners' Association, Association of Building Owners, and Portland Realty Board, has approved four proposed amendments to Oregon laws and is proposing to submit them to the Legislature. The first proposes to limit the liability of bonding companies furnishing bonds on public work to one year after completion. The second requires notices that any property is "not subject to lien" to be filed with the county clerk, rather than merely posted on the property. The third would eliminate the necessity of notifying the owner of property within five days that deliveries of material have been commenced to a contractor on a job, as a prerequisite to filing a lien if the materials are not paid for. The fourth would remove the exemption of homesteads under the present lien law.

NEW PUBLICATIONS

Hendricks' Commercial Register. 1732 pages, size 7¾ x 10¼ in. Bound in heavy board covers. Published by S. E. Hendricks Company, Inc. Price $10.

This is the Twenty-fifth Annual Edition of the well-known Hendricks' Commercial Register of the United States especially devoted to the interests of the contracting, architectural, electrical, hardware, iron, mechanical, quarrying, engineering, mining, railroad, steel and kindred industries. It is in fact a complete annual register of producers, manufacturers, dealers and consumers connected with the industries mentioned and with multitudinous other industries of interest to buyers and sellers. The products are listed from the raw material to the finished article with the concerns handling them, from the producer to the consumer. There are about 350,000 names and addresses, with upward of 45,000 business classifications. There are 1512 pages of text and a comprehensive index of contents requiring 149 pages and covering over 50,000 trade references. For the first time a list of trade names, brands, titles of identification, etc., is published and its extent may be gathered from the fact that 202 pages are required for the purpose. These trade names are printed on tinted paper at the close of the book so that they may be quickly found, while the list furnishes ready reference for purchasing agents and prospective buyers to distinctive products manufactured by firms listed in the book.

An idea of the value of the work to those engaged in the building industry may be gathered from the fact that there are 27 pages devoted to the names and addresses of architects, 30 pages to building and general contractors, 22 pages to lumber manufacturers and wholesalers, 14 pages to brick manufacturers, 12 pages to masons' and builders' materials, 8 pages to sash, door and blind manufacturers, 4 pages to roofing manufacturers, 8 pages to makers of cornices and skylights, and 14 pages to hardware manufacturers. The volume is a storehouse of information along the lines indicated and has been compiled with great attention to all essential details.

Drawing for Builders. By R. Burdette Dale, M.E. 166 pages, size 8 x 10¾ in. Illustrated by 69 figures and 50 plates. Bound in cloth. Published by John Wiley & Sons, Inc. Price $1.50.

The literature of elementary architectural drawing has received a valuable addition in the book under review, for it has been written to meet the needs of carpenters, builders and students who have had no previous training in drawing and who therefore require a simple explanation of the fundamental principles of the art. It is intended for use in home-study instruction, either with or without assistance, and the matter has been made brief enough to eliminate waste of time.

The first thing required by a beginner is a knowledge of the use and varieties of the tools with which he is to work. This information is therefore given, together with instructions on how to lay out a drawing. A list of mistakes often made is presented, so that the student may gain some idea of the ordinary errors he is likely to make unless forewarned and therefore be prepared to avoid them. Instructions in lettering are also given.

After this preliminary knowledge is gained, the student requires practice in using his instruments before he can hope to successfully draw elevations and floor plans. Therefore practice is given in drawing straight and curved lines, this being followed by problems in geometrical and projection drawing. Further problems in manual training drawing include a bracket shelf, a taboret, tool and nail boxes, an arm chair, etc.

The student is then prepared to take up more difficult work and he is given the material which, be he carpenter, builder or embryo draftsman, he should know how to draw. Building details are presented, including various moldings, a detail of a baluster, doors, windows, cornice construction, medicine case, stairs, various built-in features, floor plans, elevations and details of construction in brick, tile and terra cotta. In the more advanced drawings, the student is provided with a sketch, sufficient scale drawing and description for him to work up the finished drawing, all of which teaches him to *understand* instead of merely copying.

The author's activities as Assistant Professor in Charge of Vocational Courses in Engineering and Correspondence Instruction of the Engineering Extension, Iowa State College, have afforded him opportunities to become acquainted with the best practice along the lines indicated above and to understand how to present the material in such a manner as to interest and instruct those for whom the book is especially intended.

TO HELP REHABILITATE FRANCE

Noble Foster Hoggson, president of Hoggson Brothers, the well known New York builders, is now in Europe as a member of the American Industrial Commission to France. The commission is engaged in making a survey of the devastated section of France, to determine what America can do toward the rehabilitation of her sister Republic. Mr. Hoggson is making a particular study of the question of industrial housing, town planning, the need for factories and other commercial structures, not only as to their planning and construction, but also as to their equipment.

Work has been commenced on 50 brick houses in Waterbury, Conn., which are to be tenanted by the employees of the Scovill Mfg. Co.

MEETING OF MICHIGAN BUILDERS' EXCHANGES

FOURTH ANNUAL CONVENTION HELD IN LANSING, NOVEMBER 15 AND 16, WITH LARGE ATTENDANCE

THE fourth annual convention of the Associated Builders' Exchanges of Michigan took place in the city of Lansing on November 15 and 16, the sessions being held in the House of Representatives at the State Capitol. There were in attendance about 150 delegates from the various sections of the State, notably from Grand Rapids, Muskegon, Flint, Saginaw, Jackson, Kalamazoo, Detroit and Lansing. A few others from Marshall and other points scattered throughout the State were also present.

The convention was called to order at 2 o'clock on the afternoon of November 15 by President Wilcox, introducing Hon. J. C. Reutter, the Mayor of Lansing, who gave a very cordial address of welcome to the visiting delegates. The machinery of the convention thus being set in motion, it continued on routine business, reports of officers, etc., etc., during the afternoon, adjourning at 5.15.

THE BANQUET

A banquet served in the Chamber of Commerce Building by the ladies of the Presbyterian Church of Lansing was tendered the delegates at 6.30 o'clock of that evening, and proved to be a most enjoyable affair from all angles. The meal was attractively served, and, consisting of home cooking, was exceptionally enjoyed. Music by a local orchestra and by a large choir of well-drilled boy voices from the Industrial Home for Boys was a most pleasing feature, and called for repeated encores. The boys sang with gusto, and their voices blended beautifully. Other entertainment was furnished, and a list of speakers was called upon, who entertained very agreeably.

Following the banquet, a general bowling tournament was engaged in at the Lansing Alleys, a more of a get-together spirit than in any sense of professionalism in this particular sport.

THURSDAY MORNING SESSION

The morning session of Thursday, November 16, was called to order at 9 o'clock, and was probably the most interesting session of the entire convention. A very illuminating talk was given by Joseph G. Haufman, secretary of the Michigan Manufacturers' Association, along lines of "Laws Inimical to Building Interests," which from all appearances at this time would be introduced at the coming session of the Legislature. This included changes to the present Workman's Compensation Law, as well as other matters of extreme importance to the building trades. Frank G. Campau, attorney for the Builders' Exchange of Grand Rapids, also added very materially to the information, as did Robert K. Orr, assistant secretary of the State Association, who was formerly the manager of the Industrial Department of the Accident Fund of the Insurance Department of the State of Michigan. Much discussion was had on the subject presented, and the entire forenoon was consumed in this particular.

A number of visiting architects, consisting of the president and members of the legislative committee of the Michigan Society of Architects, were present at the sessions and joined in the discussions. A most friendly feeling was shown to exist between the architects and contractors.

The result of this discussion was tha tthe president was instructed to appoint a permanent legislative committee to unite and work with legislative committees of other associations in a combined effort to watch carefully all laws inimical to the building trades and introduce others which they thought might be of some value.

A committee was also appointed to make the necessary recommendations for assessments and the manner in which money might be raised to pay any expenses in this connection. This committee recommended that the per capita tax for the ensuing year be fifty cents per member, that the Executive Board should be authorized to make any other assessments they thought necessary in order to cover any expenses in connection with the legislative matters which they regarded important.

ELECTION OF OFFICERS

The meeting adjourned at 3 o'clock in the afternoon, after electing the following officers:

President.....Geo. B. Schroeder, Grand Rapids
First Vice-President.....C. O. Wheeler, Detroit
Second Vice-President.....Fred C. Trier, Saginaw
Secretary and Treasurer..Chas. A. Bowen, Detroit

The latter appointed for his assistant for another year Robert K. Orr of Lansing.

Flint was selected as the next place at which the convention would be held, the date for same, however, being left in the hands of the Executive Committee, as is the usual practice.

A NEW THIRTY-STORY LOFT BUILDING

Among the plans filed with the Bureau of Buildings for the Borough of Manhattan in anticipation of the passage of the zoning ordinance in July last were those for a thirty-story hotel. This project, however, has just been replaced by plans for a thirty-story loft building to cost in the neighborhood of $800,000 and which will occupy the plot at

the southwest corner of Broadway and Forty-eighth Street, New York City. The plans for this improvement which were filed Oct. 13 were prepared by Architect E. D. Litchfield.

According to the architect's design the structure will have twin-towers each about 50 ft. in area which will make it the tallest building of its character in this country if not in the world and sharing this distinction with a similar structure erected a few years ago in West Fortieth Street. The main feature of the new building will be its exceptional lighting facilities, protected for all time above the fourteenth story by the new ordinance which limits the height of buildings to that level in that particular section of the city.

The southerly line of the site of the new building extends for a distance of 140 ft. along the line of the Strand Theatre property, this low structure increasing the lighting facilities of the proposed building which has been planned for immediate construction on the assumption that the opening of the Seventh Avenue and Broadway subways will soon make this one of the important trade centers of the city.

OCTOBER TENEMENT HOUSE CONSTRUCTION IN NEW JERSEY

The following compilation shows the amount of tenement house construction in New Jersey in October, compared with the same month a year ago:

Municipalities	1916, Estimated Cost	1915, Estimated Cost
Athenia	$8,000	.....
Atlantic City	33,000	.....
Bayonne	6,000	$15,000
Belleville	5,000	.....
Bloomfield	.....	3,000
Cliffside Park	.....	3,000
East Orange	78,000	5,000
Elizabeth	7,000	.....
Garfield	5,000	8,000
Harrison	5,000	.....
Hoboken	16,000	.....
Irvington	10,000	31,000
Jersey City	108,000	115,000
Kearny	16,000	11,000
Newark	109,000	231,000
North Bergen	.....	6,000
Passaic	4,000	14,000
Paterson	7,000	5,000
Town of Union	25,000	.....
Weehawken	.....	110,000
West Hoboken	.....	24,000
West New York	80,000	11,000
Woodcliffe	.....	14,000
Total	$522,000	$606,000
Alterations	25,900	23,600
	$496,100	$582,400

The noticeable features are the heavy falling off in operations in Newark and Weehawken.

ROOFINGS AND THEIR MARKET IN LIBYA

Until a comparatively recent date there was no market for ready roofings in Libya, North Africa, but Italian influence has now changed this condition; new types of roofs have been introduced, and a gradual increase is likely in the utilization of such products; but to make the demand important great changes must take place in the habits and purchasing power of the native masses. Of the 1,050,000 inhabitants in Libya, 95 per cent are Arabs, and a large proportion of these are nomadic. Natives who live in the oases have fixed habitations, simple dwellings of stone, sun-dried bricks, or packed earth, with roofs fashioned from datewood rafters overlaid with palm leaves and straw, the whole being covered with a coating of lime plaster. In coast towns, structures are either of stone or brick, with division walls of like material.

All roofs in this last class of buildings were formerly flat, and covered with lime concrete. With the arrival of the Italian forces in 1911, the need for military accommodations caused great building activity. Temporary structures were erected of wood, roofed with Eternit, corrugated iron, pariod, or rubberoid. Later, similar quarters were built at interior points and knockdown houses of German origin were introduced. In buildings of a more permanent character, reinforced concrete, concrete blocks, bricks, and Eternit have been used.

It is estimated that in 1912 imports of roofing materials totaled not less than $50,000, and in 1913 about $40,000, fully 75 per cent being "Eternit," an artificial stone said to be composed of asbestos, other mineral substances and chalk, fixed and hardened with acids. American participation in 1912 amounted to $2,000, and in 1913 to $4,100. At present there is a lull in building operations, and the future demand is uncertain. The demand for building papers other than roofing is limited.

ARCHITECTURAL LEAGUE OF NEW YORK

According to the circular of information just issued, the thirty-second annual exhibition of the Architectural League of New York will be held in the building of the American Fine Arts Society, 215 West Fifty-seventh Street, from Feb. 4 to Feb. 24 inclusive, 1917. The exhibition will consist, as has its predecessors, of drawings and models of proposed or executed work in structural, decorative and landscape architecture; sketches and finished examples of decorative painting; sketches, models and finished examples of decorative and monumental sculpture. Competitions to be held under the auspices of the Architectural League, include one for the Henry O. Avery prize for sculpture, the subject being a triumphal arch commemorating the Renaissance of Peace. It is designed to be located in a public square of a large city formed at the intersection of wide avenues. There is also to be a competition for a special prize of $300 for the best design submitted by an architect, sculptor and mural painter in collaboration. The Avery prize will be awarded on the sculptural element and the award of the collaborative prize will not render the work of the collaborating sculptor ineligible therefor.

According to the annual report of Municipal Architect Snowden Ashford, there has been an increase since 1898 of 60 per cent per cubic foot in the cost of buildings erected in the District of Columbia. He predicts a further increase during the next year.

CURRENT NEWS OF BUILDERS' EXCHANGES

NEW QUARTERS OF CLEVELAND EXCHANGE —A BUILDING EXHIBIT FOR ATLANTA, GA.

Cleveland Exchange Has a Housewarming Party

SEVERAL hundred members of the Builders' Exchange in Cleveland attended a house-warming party in the new quarters on the third floor of the Rose Building, Wednesday evening, Oct. 25. The exchange has recently fitted up what is considered to be one of the best headquarters for builders in the United States, comprising about 16,000 square feet of space. The floor has been divided into compartments for exhibits and offices occupied by members of the organization. Upward of $18,000 have been expended in the improvements.

The quarters comprise a large main floor, which is connected with an additional section through an arcade of exhibits. The architectural plan was prepared by Messrs. Hubbell & Benes, architects, and many artistic features have been introduced, making the exchange very attractive. Some of the exhibits are costly, representing the most modern ideas in presenting possibilities of materials and appliances. Other features of the new exchange are a "lounge" for members, a large committee room, plan rooms, coat room, and assembly hall capable of seating upward of 200 persons.

At the house-warming party the wives and families of members were included. An orchestra provided music during the evening, and there were several vocal numbers, including solos by F. J. Dresser, a member of the Board of Directors. Addresses were made by President Klumph and other speakers. Following this part of the program dancing was enjoyed in the assembly hall. Refreshments were served, and altogether a most enjoyable evening was afforded under the direction of the entertainment committee of the exchange.

Weekly Meetings of Grand Rapids Builders' and Traders' Exchange

The regular weekly meetings of the Builders' and Traders' Exchange of Grand Rapids, Mich., started on Nov. 22. In announcing the resumption of these enjoyable affairs, Secretary A. H. Shank said: "We will have four noon meetings and the fifth will be in the nature of a banquet, to be held at 6:30 p. m. in some one of our hotels. At this fifth meeting reports of all committees will be heard and such other business as will be necessary will come before the membership. We will, of course, have a good speaker at this meeting for the members' entertainment."

Activities of the Pittsburgh Builders' Exchange

At a recent noonday luncheon of the Builders' Exchange of Pittsburgh, Pa., a movement was started looking to securing for the city the 1918 convention of the National Association of Builders' Exchanges. A club has been organized in Pittsburgh to attend the 1917 convention to be held next February in Atlanta, Ga., and the idea is to secure a large number of recruits to go to Atlanta and boom Pittsburgh. Incidentally Robert K. Cochrane of Pittsburgh is a candidate for the presidency of the national organization, and a rousing campaign for him is under way.

President S. P. Trible has appointed a committee to assist the entertainment committee, also a paper publishing committee and a nominating committee.

Permanent Building Exhibit for Atlanta

Members of the Builders' Exchange of Atlanta, Ga., have decided that that city must stand among the progressive communities housing permanent building exhibits. While the plan is still more or less embryonic, a committee has been appointed by President C. W. Bernhardt to investigate the various angles of the undertaking. This committee is composed of C. G. Bradt, Fair Dodd, T. T. Flagler, J. M. Clayton, R. M. Walker, Edgar Alexander, D. A. Farrell, L. T. Whitfield and A. A. Craig.

Luncheons of Philadelphia Builders' Exchange

The weekly luncheons of the Builders' Exchange of Philadelphia, Pa., are one of the enjoyable features instituted by that organization, and many interesting hours are spent in listening to the talks made by various guests. Among those who have recently helped to entertain the members by interesting remarks are Major Hollenback, third vice-president of the exchange, who, on Oct. 12, gave an enjoyable talk on "The Life of a Soldier," in which he spoke of his experiences for three months on the Mexican border. On Oct. 19 E. J. Cattell addressed the organization, and on Oct. 26 Michael Francis Doyle, one of the counsel for the late Sir Roger Casement, delivered a talk upon present day conditions in England. On Nov. 2 Thomas A. Daly addressed the exchange.

SOUTHWESTERN CONCRETE SHOW

Arrangements are being made for holding the first annual convention of the Southwestern Concrete Association in Kansas City, Mo., Feb. 19 to 24 inclusive, 1917. There will also be held in connection with the convention, a concrete show of which Charles A. Stevenson of 1413 West Tenth Street, Kansas City, Mo., is the chairman. We understand that it is the expectation of the management to go into the convention with at least a membership of five hundred.

BIRMINGHAM MODIFIES ITS ANTI-SHINGLE LAW

Some time ago the city of Birmingham, Ala., adopted a drastic anti-shingle ordinance which time has demonstrated to be a failure, and it has recently been annulled. A new ordinance which has been passed forbids the use of wooden shingles in the restricted business districts, but very materially modifies the regulations against the use of shingles in the residential districts.

It is estimated that there are 63,590 brick and 26,576 frame buildings in the District of Columbia.

BRIEF REVIEW OF THE BUILDING SITUATION

BUILDING OPERATIONS FOR OCTOBER SHOW 23.6 PER CENT INCREASE OVER OCTOBER, 1915

THE activity in the building industry as contrasted with the current period a year ago continues to make progress and reports from 121 cities of the country show a gain in the estimated cost of new construction work in October of 23.59 per cent, as compared with the same month last year. The figures available show that all sections of the country are reflecting the improved conditions, but it is particularly noticeable in the extreme Western section and on the Pacific Coast.

There are forty-seven Eastern cities reporting which show a gain of 24.95 per cent over October last year, this being due in large measure to the greater amount of new construction work planned in Hartford, New Bedford, New Haven, the Borough of Manhattan in Greater New York, Philadelphia, Portland, Reading, Rochester, Schenectady and Worcester. The accompanying table affords an idea of the situation in the Eastern section of the country.

CITIES OF EASTERN STATES

	October, 1916	October, 1915
Allentown	$128,535	$154,725
Altoona	96,869	84,229
Atlantic City	127,120	168,632
Bayonne	87,645	82,944
Belleville, N. J.	26,190	22,005
Binghamton	130,928	171,656
Boston	2,357,338	2,098,209
Bridgeport	572,463	655,354
Brockton	80,925	75,160
Buffalo	972,000	856,000
East Orange	177,544	66,770
Elizabeth	159,226	108,109
Erie	348,242	92,282
Harrisburg	140,526	158,400
Hartford	1,171,569	493,718
Haverhill	136,650	142,500
Holyoke	109,190	88,975
Lawrence	194,375	173,430
Manchester	194,989	290,779
Newark	663,790	723,279
New Bedford	407,312	151,675
New Britain	276,825	124,725
New Haven	642,605	280,120
New York:		
Manhattan	6,009,800	2,420,750
Bronx	925,450	2,235,000
Brooklyn	2,518,950	3,303,400
Queens	1,672,525	1,169,695
Richmond	416,155	213,680
Passaic	219,545	54,365
Paterson	200,684	90,496
Philadelphia	4,055,045	2,980,665
Pittsburgh	875,790	1,274,960
Portland	518,647	351,030
Quincy	124,773	96,103
Reading	145,275	91,775
Rochester	1,032,370	784,969
Schenectady	222,670	62,061
South Orange	24,794	16,786
Scranton	90,295	113,450
Springfield	344,830	386,792
Syracuse	463,865	389,260
Trenton	297,539	131,624
Troy	62,875	65,059
Utica	238,275	279,925
Wilkes-Barre	84,478	40,283
Woonsocket	61,325	11,460
Worcester	514,608	370,142

From the middle section of the country we have reports from thirty-four cities of which twenty-three show increases over October last year with a resultant gain of 17.63 per cent. Noticeable increases are found in Cleveland, Columbus, Des Moines, Detroit and Milwaukee, while decreases are noticeable in Akron, Chicago, Kansas City and Minneapolis.

CITIES IN MIDDLE STATES

	October, 1916	October, 1915
Akron	$1,077,088	$1,215,045
Canton	322,685	173,600
Cedar Rapids	267,000	116,000
Chicago	11,408,300	12,479,250
Cincinnati	823,880	865,575
Cleveland	5,262,355	3,097,501

CITIES IN MIDDLE STATES—Continued

Columbus	575,630	390,685
Davenport	121,590	67,255
Des Moines	345,130	211,701
Detroit	5,755,540	2,611,400
Dubuque	47,275	9,365
Duluth	225,916	217,240
East St. Louis	112,500	76,508
Ft. Wayne	302,500	259,800
Grand Rapids	174,270	178,576
Kansas City, Kan.	42,890	65,894
Kansas City, Mo.	1,093,521	1,512,013
Lincoln	69,575	103,010
Milwaukee	1,639,587	637,936
Minneapolis	1,454,675	2,338,555
Omaha	436,640	360,225
Peoria	193,465	109,700
St. Joseph	66,575	61,818
St. Louis	1,333,381	1,214,618
St. Paul	880,512	739,308
Sioux City	163,200	147,950
South Bend	116,535	38,235
Springfield, Ill.	81,265	162,335
Superior	377,226	43,072
Terre Haute	173,999	37,268
Toledo	774,544	815,552
Topeka	37,576	55,759
Wichita	86,975	41,440
Youngstown	382,480	341,685

Taking now the Southern tier of States, reports from twenty-four cities show a gain of 18.83 per cent, due in large measure to the increased activity in Baltimore, Fort Worth, Jacksonville, Memphis, Nashville, New Orleans, Richmond, Savannah, Shereveport, and Wilmington.

CITIES IN SOUTHERN STATES

	October, 1916	October, 1915
Atlanta	$311,107	$252,251
Baltimore	680,000	629,138
Birmingham	148,733	136,747
Charlotte	66,600	277,820
Chattanooga	55,403	90,440
Dallas, Tex.	181,226	243,887
El Paso	291,965	215,585
Fort Worth	224,647	91,192
Jacksonville	111,985	50,260
Huntington	132,170	74,040
Louisville	321,510	271,640
Memphis	320,560	165,005
Montgomery	30,845	23,747
Nashville	530,733	181,738
New Orleans	121,402	65,590
Norfolk, Va.	145,299	120,288
Oklahoma City	293,094	424,945
Richmond	397,745	181,203
Savannah	373,065	55,515
Shreveport	194,284	75,124
Tampa	72,523	158,210
Waco, Tex.	69,010	98,625
Washington	1,099,744	1,344,999
Wilmington	204,070	130,352

The greatest gain of all is found in connection with the sixteen Western cities reporting. Here the increase over October, last year, is 60.77 per cent. Los Angeles, Seattle, Stockton and Denver report an unusual amount of new construction work being planned.

CITIES IN EXTREME WESTERN STATES

	October, 1916	October, 1915
Berkeley, Cal.	$179,250	$126,150
Colorado Springs	15,544	32,162
Denver	277,350	192,450
Los Angeles	1,408,738	787,389
Oakland	441,690	467,339
Pasadena	75,151	205,955
Portland	695,945	210,595
Sacramento	120,160	99,277
Salt Lake City	260,435	167,655
San Diego	148,814	120,385
San Francisco	1,010,464	1,236,249
San José	373,120	72,003
Seattle	1,894,305	550,765
Spokane	122,702	162,023
Stockton	459,191	186,687
Tacoma	96,427	70,205

Work has been commenced upon a steel skeleton frame theater, store and studio building in Los Angeles, Cal., which will be twelve stories in height and the theater auditorium will seat 3000 people.

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to do with the Various Branches of the Building Business

New Method of Making "Classik" Steel Ceilings.

It is a well-known fact that manufacturing methods in all lines are constantly changing to the end that the greatest degree of efficiency may be secured. For years the majority of steel ceilings were made by the drop-hammer method of stamping the steel sheets. This method, however, has been dispensed with in the case of the Berger Manufacturing Company, Canton, Ohio, and its "Classik" steel ceilings are now stamped on a new, original and specially designed draw press under 900 tons pressure. This enormous pressure, it is claimed, assures absolute uniformity in depth, detail and size, each plate being pressed separately and is an exact counterpart of the others. Skilled artisans are continually originating new and distinctive designs in clay and from these are made the dies from which the steel ceilings are reproduced. The "Classik" line comprises hundreds of attractive patterns, each designed to harmonize with a particular type of architecture. One of these is illustrated in Fig. 1. Another distinctive feature of "Classik" ceilings is the improved bead and button construction which closes the joint tightly without tamping and calking. This construction is such that after a ceiling is erected, it is said to have the appearance of a single steel sheet. The company has issued a handsome catalog illustrating and describing the "Classik" steel ceilings and a copy will be sent to any interested reader who may make application for it.



Fig. 1—New Method of Making "Classik" Steel Ceilings

Philadelphia Office of Standard Scale & Supply Co.

The Standard Scale & Supply Co. has moved its Philadelphia office, warerooms and Service Department from 35 South Fourth Street, to 523 Arch Street, the building having a depth of nearly 300 ft., extending through to 518 Cherry Street. These larger quarters are necessary to take care of the various departments and stock of Concete Mixers, Hoisting Outfits, Power Pumps, Gasoline and Oil Engines, Scales and Trucks, as well as Repair Parts for Engines, Hoists, Mixers, Etc., which are carried at all branches of this company in connection with a special Service Department operated to give the advantage of quick service and repairs in case of adjustments or breakdowns.

Peerless Molds for Concrete Silos

The rapid increase in silo construction throughout the country renders more than ordinarily interesting the Peerless molds for monolithic concrete silos and the line of straight wall molds made by the Enterprise Concrete Machinery Co., 532 First National Bank Building, Chicago, Ill. The silo equipment is made in 5, 6 and 7½-ft. heights, the size used governing the daily capacity. In Fig. 2 is shown the "forms" when set up, the 6-ft. mold being made in two 3-ft. sections and the 5-ft. mold consisting of two sections of the 7½-ft. mold, each of which is 2½ ft. high. It will be seen that the design provides for a chute, with continuous doorway and steel doors, of which the company claims to be the originator. The equipment comprises a mold with chute sections, door jamb forms, a form for roof cornice, combination derrick and scaffold with four jacks for raising derrick-scaffold and outer sections of mold; an adjustable, pivoted cement hoist, two drop-bottom buckets, two raising hooks, two drop ladder hooks, a complete set of clamps, spacers, collapsing plugs and lock or wedge fastenings. In the Peerless system no center-mast is required, as formerly, which has been discarded for the simple, less complicated and more efficient truss scaffold and derrick combination that is carried right along with the mold as it works upward. Four small jacks, with a man at each jack, are sufficient to quickly and easily raise the derrick-scaffold to receive the ring of mold ready to be raised, and the same procedure lifts



Fig. 2—Peerless Molds for Concrete Silos

the section of mold, as shown in the accompanying illustration. Whether using a two or three-section mold, the operation is the same. The lowest ring of the mold is always brought to the top and one ring filled at a time, reinforcement and ladder iron being installed at the same time. The company uses and recommends triangular mesh reinforcing, made from cold-drawn steel wire, which is furnished in rolls of 150, 200 and 300-ft. lengths and suitable widths. The molds are made up of black stock, unless otherwise ordered.

New Stanley Garage Door Hinge.

A hinge provided with weather-tight ball bearing washers fitted between its hinge joints and especially designed for heavy garage doors has just been placed upon the market by the Stanley Works, New Britain,

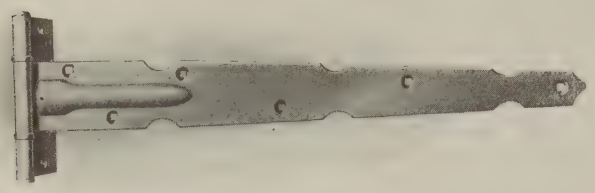


Fig. 3—General View of the Hinge

Conn., as an addition to its line of garage hardware. This new hinge swings the door completely clear of its opening and therefore is particularly adaptable to garages with narrow entrances. The strap is 24 in. long and is provided with ornamental corrugation, which adds to its strength and general appearance. The hinge is easily applied, as mortising is unnecessary. Two of the screw holes in the pad are exposed on the outside and three screw holes are covered by the long leaf, so that when the door is closed the hinge may not be removed. In order to use this hinge the casing should be flush with the face of the door. In Fig. 3 is shown the general appearance of the hinge itself, while Fig. 4 represents a horizontal section through the door and frame at the point where the

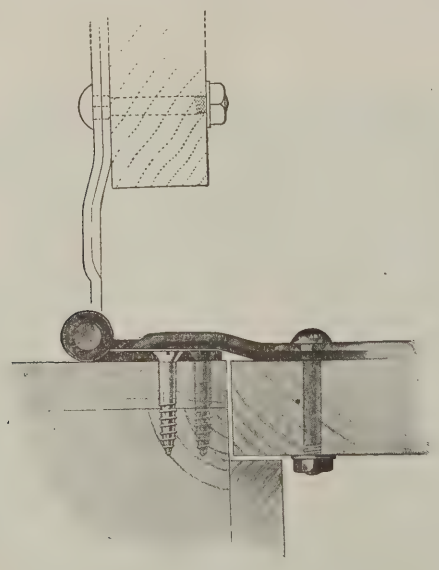


Fig. 4—Horizontal Section Through Door and Frame at the Point Where the Hinge is Applied

hinge is applied, and by means of the dotted lines shows how the door is carried away from the opening, leaving the entire entrance unobstructed. This new garage hinge is made in dead black japan, plain japan, Stanley sherardized, or in dead black japan over Stanley sherardized.

The company has recently issued a catalog in which this new hinge is illustrated and described and a copy of it will be sent to any builder who may make application for it. The hinge is packed one pair in a box with 2-in. No. 20 wood screws. The hinge, however, is made with combination holes for either screws or bolts and whenever specified, ⅜ x 3 3¼-in. carriage bolts for the strap and 2-in. No. 20 wood screws or ⅜ x 2-in. lag screws for the pad will be furnished.

Patent Granted for Surface Sealed Beaver Board.

Builders throughout the country will be interested in learning that Beaver Board Companies, Buffalo, N. Y., has been granted a patent covering the method by which Beaver board is surface sealed and sized to render it moisture-proof. The point is made that the surface sealing of Beaver board not only protects the front surface but gives a double coating on the back, which is a vital point every wall-board user should consider. All wall board is painted on the front and receives at least that much protection on that side. It is the back, however, where occur most of the moisture and temperature changes, and Beaver board, as a result of this patented treatment, is equally protected on both the front and back after painting. The patent in question grants Beaver board the exclusive right to be protected by this surface scaling and sizing treatment. A letter sent out by the company and of the folder type carries a photo-reproduction of the patent specification in question and there are also shown tests which demonstrate how completely this patented surface sealing makes Beaver board moisture-proof.

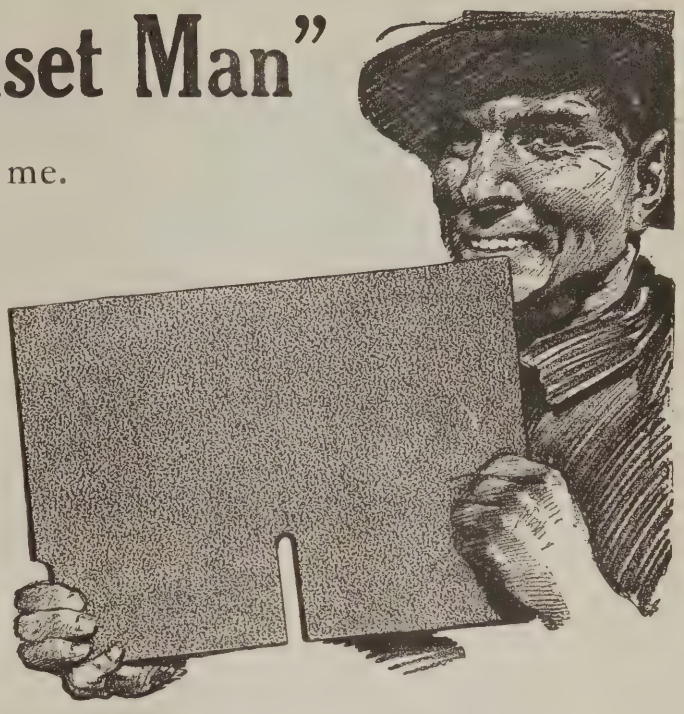
Asbestos Roofing and Shingles.

The question of fire resisting materials as roof coverings is always an interesting one, and the two new catalogs which have been prepared by the H. W. Johns-Manville Co., 296 Madison Ave., New York City, N. Y., contain information likely to command the attention of builders, architects, engineers, etc., the country over. One, entitled "J-M Transite Asbestos Shingles," was prepared for the attention of the architect and the home owner and contains numerous halftone illustrations of residences, churches, garages, barns, etc., which have been covered with these shingles. Asbestos shingles are a combination of asbestos rock fibre and Portland cement compressed under hydraulic pressure, the claim being made that their rock-like base and tough, resilient strength make them unaffected by time, fire or the elements. The various sizes and shapes of shingles are illustrated, together with the manner of applying them, in the styles known as American, Hexagonal and Diagonal, all of which are fully described. Prices for the various shapes and sizes, their weight and other interesting information are also given. These shingles are furnished in various colors. A page entitled "Handy Data on Roofs from Leading Authorities" contributes to make up an extremely interesting catalog.

The other catalog is entitled "Johns-Manville Corrugated Asbestos Roofing," a large part of which is devoted to illustrations of a few of the many large buildings, plants, etc., where this type of roofing is said to be giving "satisfaction under severe conditions." Corrugated Asbestos Roofing is made of a perforated metal sheet, which acts as a reinforcing, to each side of which is applied plies of asbestos felts thoroughly impregnated with asphalt and cemented together by a combination of Trinidad Lake and other natural asphalts. The edges of the metal core are overlapped with the asbestos covering, and for further security the edges are bound with asphalt impregnated tape. This roofing is applied in the same manner as corrugated iron and can be laid directly on the purlins. It is said that no expensive cementing

(*Continued on page 78*)

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San Francisco Los Angeles Seattle London

The "Viceroy," Plate V-12
[Patent Applied For]



or special jointing are required. A valuable feature of the catalog is the number of details given of the various parts of a building and the proper method of applying asbestos roofing thereto.

"Kno-Burn" Corner Angles

Builders throughout the country are likely to be interested in the corner angle for preventing the cracking of plaster at the corners of rooms, which has been introduced to the trade by the North Western Expanded Metal Company, 904 Old Colony Building, Chicago, Illinois, and a general view of the application of which is presented in Fig. 00. There is nothing complicated in regard to these angles as they consist simply of strips of "Kno-Burn" expanded metal lath cut

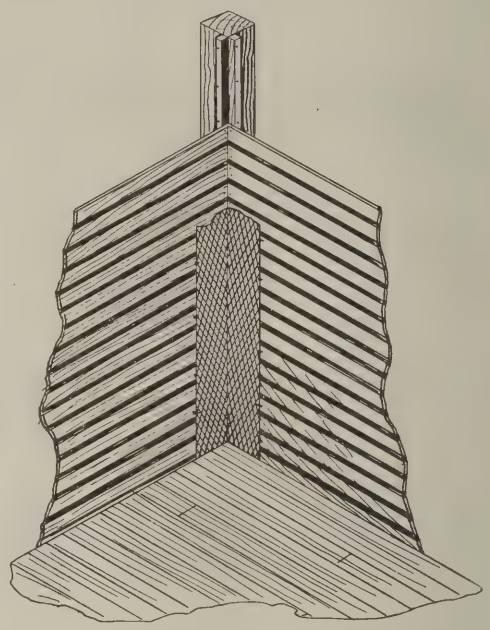


Fig. 5—The "Kno-Burn" Corner Angles

8 in. or 12 in. wide and which can be bent on the job to fit the corner. The usual practice is to tack one side of the sheet either 4 in. or 6 in. away from the corner, depending upon the width of the sheet, and then with a hammer or hatchet drive the sheet into the corner and tack the opposite side. A good idea of the appearance of the corner after it is in place may be gained from Fig. 5 of the illustrations. The stock sizes of the corner angles are 3 x 3 in. and 4 x 4 in., each size being in 8 ft. lengths.

New Offices and Laboratory of Sanford E. Thompson.

Readers of the BUILDING AGE will be interested in learning that Sanford E. Thompson, the well-known consulting engineer and whose contributions on concrete work appeared some time since in these columns, has opened new offices and laboratory in the Federal Street Building, Boston, Mass., these replacing both the Newton Highlands and the Milk Street offices. The laboratory equipment has been developed as a result of a great number of special cases requiring apparatus, as for example a concrete saw and a 125-ton compression machine, not usually found in laboratories making only routine tests, which renders it possible to handle work of an original nature. It is interesting to state that association in a consulting capacity with large and important constructions in reinforced concrete and steel as well as many cases requiring particular advice and decisive reports on materials, methods, cost analysis and economical plant operation have peculiarly fitted the Thompson organization not only for original design and construction and tests but for investigations in-

(*Continued on page* 80)

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Bungalow, Drexel Hill, Pa.
Designed and built by L. W. Goodman.

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Send me your "Guide to Good Stucco," together with Specifications—also the Contractor's Atlas and special sales information on Subjects checked:
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volving complex problems. Associated with Mr. Thompson is William O. Lichtner, a well-known civil and mechanical engineer.

New Type of Casement Window Stay.

A new type of casement window stay has just been placed upon the market by the Monarch Metal Weather Strip Co., 4121 Forest Park Boulevard, St. Louis, Mo. The feature is that no hand adjustment is necessary, as the fixture is entirely automatic and the "Monarch" is said to hold the window in any position desired, without strain or rattle. The fixture is attached to the upper part of the window and is invisible when the window is closed. The construction consists of brass tubes fitted on the telescopic principle, sliding in or out as the window is opened or closed. The inner tube is provided with two "friction shoes," fitted to and pressed against the walls of the outer tube by the action of an expanding member. This is said to hold the window securely at any angle and to eliminate all vibration and noise. The stay is furnished in a polished brass finish and other finishes are supplied when desired. The new stay is illustrated and described in a booklet entitled "Entirely Different," which can be had upon application to the address above.

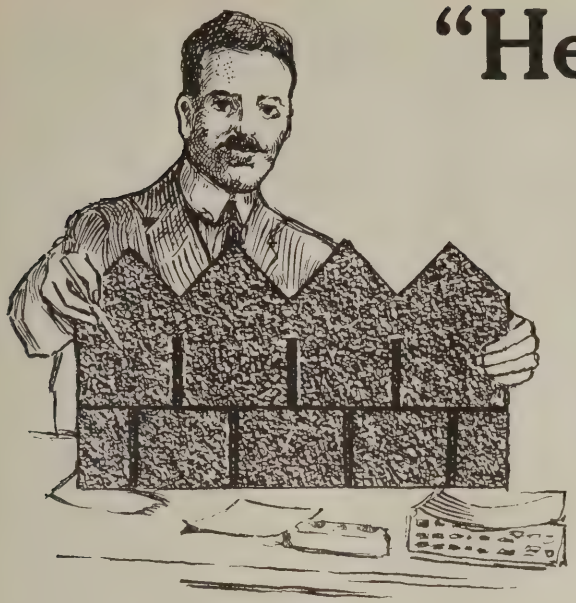
Ventilation of Farm Buildings.

It is a well known fact that a sufficient supply of fresh air is essential to the welfare of live stock, for they cannot thrive if the barn in which they are housed is poorly ventilated. The stock which are in the pink of condition generally receive the cheapest gift the farmer can give them, and yet one which is as important as the best food, namely, fresh air. The old-style wooden monitor or cupola has many drawbacks, and efficiency is better promoted by a ventilator with more positive characteristics; that is, one which will create a uniform up-draft at all times, regardless of outside wind pressure and weather conditions. The scientific arrangement of bands and curved metal shapes of the Buckeye Cupola Ventilator is such as to cause, it is said, the slightest breeze to create a vacuum in the ventilator head, which makes a distinct suction in the cupola and thus draws the foul air from the barn. A simple explanation of the scientific reasons as to why pure air is important and the relation between fresh air, health and efficiency is explained at length in a new booklet issued by the Thomas & Armstrong Company, London, Ohio, and entitled, "The Proper Ventilation of Farm Buildings." The parts and construction of the Buckeye Ventilator are herein illustrated and described, a full page drawing showing the cross-section of a barn with the ventilator installed. There are also numerous illustrations of the ventilators in use and letters from satisfied users thereof, together with a handsome double page in colors showing a group of farm buildings equipped with Buckeye ventilators, and with the contented-looking cows occupying th eforeground of the picture.

A New Sound-Absorbing Stone.

Our readers will be interested in the official announcement of the Johns-Manville Company, through C. M. Swann of its General Acoustical Department, that the company is now ready to furnish J-M Akoustolith—a new sound absorbing stone. The progress of the science of acoustics, and the demand for a structural material which should absorb sound have resulted in the production of this acoustical stone, which has a degree of absorption comparable with hair felt of equal thickness. This new production opens up great possibilities to the architect and builder on account of its durability, lightness, beauty of texture and flexibility

(*Continued on page* 82)



"Here's what won me that roofing contract"

"IT was a fat job—but I couldn't figure out how to underbid the other fellow. Then I learned about FLEX-A-TILE Slab Shingles, and the saving in labor, freight and nails they claimed. Tried them—and found it was *true!* A Slab of *four* FLEX-A-TILE Shingles could actually be laid in the same time as *one* ordinary shingle. They were *self-spacing*. They used only five nails instead of eight. I made a lower bid—and got the contract, thanks to

FLEX-A-TILE

Asphalt Slab Shingles

The name FLEX-A-TILE stands for the best quality Asphalt Roofing produced—and that means the best of *all* roofings for durability, beauty and economy. FLEX-A-TILE Slab Shingles are a better buy for the client; cost less than a wood-shingle roof. They are a better choice for the contractor; save him time and money on the job, and stand as a lasting advertisement of his work.

FLEX-A-TILE Shingles are made to *endure*, of thick wool felt, saturated in twice its weight of the highest-grade asphalt, coated with rubbery gilsonite and surfaced with crushed slate or granite, under tons of pressure.

Three styles of FLEX-A-TILE Slabs are made, in either rich red or deep green, allowing of many beautiful and varied effects in laying. The colors, being the natural stone colors, only grow richer with age.

Write for a Sample

with prices and complete information on FLEX-A-TILE Slab, Roll or Individual Shingles. Mention your business and we may be able to furnish many helpful facts. Write today.

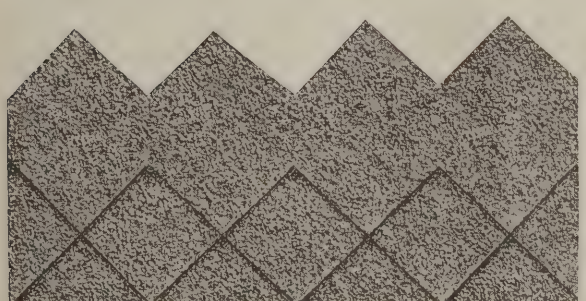
Agencies open in some territories. Write for our offer.

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FLEX-A-TILE Roll Shingles ***Utility Board*** ***No-Tar Asphalt Paint***

Other Guaranteed Heppes Products



FLEX-A-TILE Diamond Point Slab, laid in American Diamond Style



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REX PRODUCTS

—It is the most complete book of its kind ever published—112 pages—over 180 illustrations—a valuable book for the architect, builder or user to have for reference.

—Complete information about all kinds of roofings (tin, slate, steel, tile, asbestos, prepared roofings, wood shingles, asphalt shingles)—full description of all our REX GUARANTEED PRODUCTS.

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Catalog and Samples Free on Request

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Business.....

of application with a high degree of absorption for sound. It is supplied in a variety of stone colors, in buffs, browns and grays, and has a weight but one-third that of ordinary stone.

Florida Business in "Carey" Products.

The Florida business of the Philip Carey Co., 1020 Wayne Avenue, Lockland, Cincinnati, Ohio, was taken over on Oct. 14 by the Cameron & Barkley Co., well and favorably known throughout the State, having been for some years established at Jacksonville and Tampa. The headquarters of the Cameron & Barkley Co. are at Charleston, S. C., but the Florida operations are conducted from the points named. The Jacksonville branch of the Philip Carey Co. has heretofore done a large business under Manager H. L. Seymour, who will continue with headquarters in Jacksonville. The change has been made because of the superior inducements offered by combining organization and influence with one of the best known institutions of the South. Every effort is to be made to continue and improve the excellent service heretofore offered the users of Carey materials.

The "Standard" Snowguard

Builders and house owners are likely to be interested in a new snow guard which has recently been placed on the market by William Cromley, Lewisburg, Pa., and a view of which is given in Fig. 6. It is known as the Standard Snowguard and is intended for use on either slate or shingle roofs. It is offered as a strong ornamental and durable snowguard, simple in its construction and application. It consists of a strap 1 in. wide, 3/16 in. thick and designed to run 8-in. up under the slate or shingle. The outstanding feature is the spring loop on the end of the guard which is peculiar to it. This spring loop absorbs the sliding snow and ice that might break a rigid guard or loosen the nails or screws with which it is fastened to the roof. It will be noticed that the guard is completed with malleable iron castings which fit over the upturned end of the spring and is held in place by a rivet.

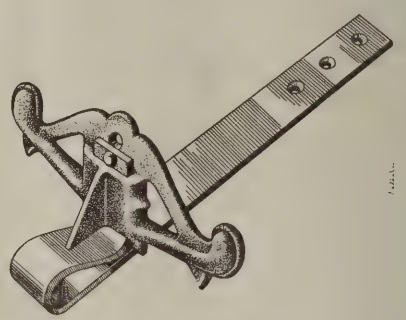


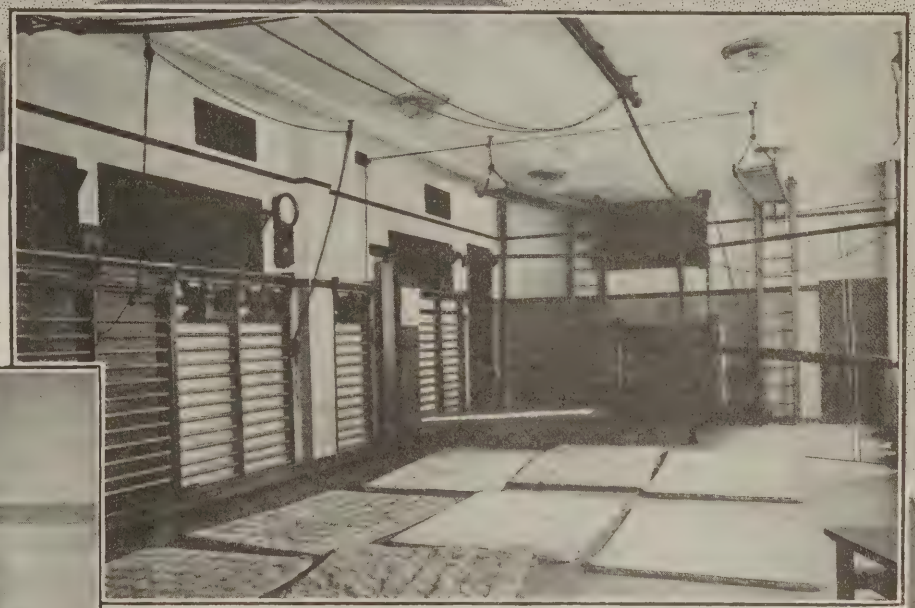
Fig. 6—The Standard Snow Guard

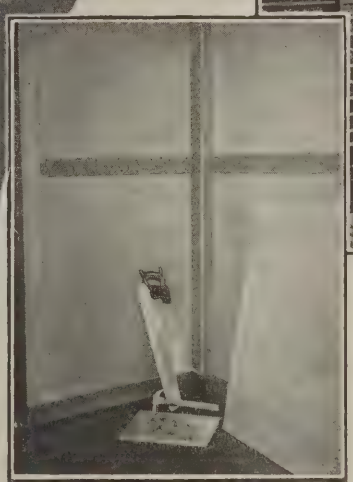
New Sheet Metal Plant

Galesburg Sheet Metal Works, Galesburg, Ill., has completed the erection of a new plant, 50 x 150 ft., of brick and concrete construction. Increased capacity has been provided and plenty of light and ventilation assured by the installation of several large skylights, equipped with ventilators, and windows on three sides of the building. The floor plan includes a drafting room and office at the front, with a driveway between, so that the truck can be driven directly into the shop, thus facilitating the loading and unloading of materials. An electric motor has been installed for power, and in the near future the company will add to its mechanical equipment. This concern manufactures sheet metal cornices, metal ceilings, skylights, finials, crest-

(*Continued on page* 84)

Where there's no fuel there can't be fire





Ambler Asbestos Building Lumber Used for Interior Work in Gymnasium, Washington Irving High School, New York City.

GREAT fire disasters in schools, theaters, churches or factories dot the history of the past like red horrors. Don't run the risk of any of the buildings you plan or erect being one of the number. Most of those fires originated in the interior of the buildings, starting from some trifling cause—a carelessly dropped match, an "extinguished" cigarette or a worn insulation. Most of those fires could have been prevented or controlled if the interior work had been constructed of

For Fireproof Ceilings, Walls, Stairways, Wainscoting, Partitions, Shafts, and Isolation of Electrical Apparatus.

Ambler Asbestos Building Lumber

Nothing to Burn

For Ambler Asbestos Lumber cannot take fire or communicate fire under any conditions. It is made of Portland Cement, reinforced with Asbestos Fibre—two absolutely non-combustible materials. It practically lasts forever without any attention whatever.

Anything that can be made of lumber can be made of Ambler Asbestos Building Lumber. It can be sawed, drilled or screwed. The natural gray color is pleasing and permanent; painting as a preservative is unnecessary, but when desired it can be painted and grained, and takes a good finish.

Let us send you our booklets showing Ambler Asbestos Products in actual service. Samples, too, if you wish. They will solve your fireproof problems—for interior and exterior.

Keasbey & Mattison Company
Ambler, Pa., U. S. A.

Manufacturers of Asbestos Shingles, Building Lumber, Corrugated Sheathing, Pipe and Boiler Coverings.

B-2

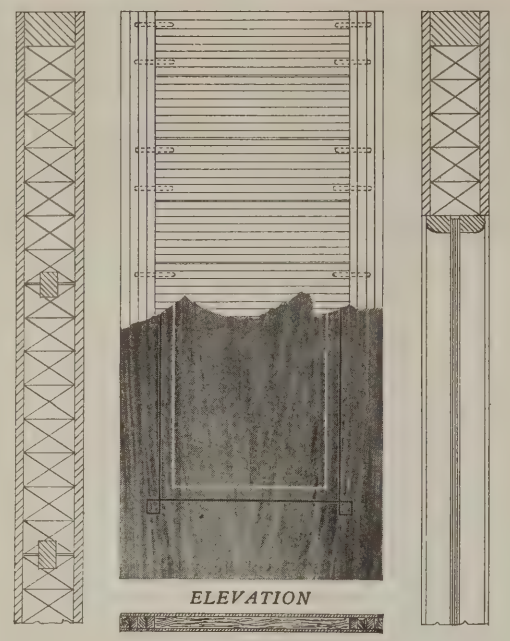
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Interior Lumber.....
Pipe and Boiler Coverings, Paper, etc.....

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ADDRESS .....
.....



We take pleasure in calling your attention to the construction of our "No Warp" Sanitary Doors, as illustrated above. They are made in the best manner, having cores formed of thoroughly seasoned laminated Chestnut stiles and rails, cross-framed and doweled together, and covered with 1-8 inch face veneers, and WILL NOT WARP OR TWIST.

We recommend them in all cases where sanitary doors are desired, and guarantee them for one year against defects due to the use of improper material or defective workmanship.

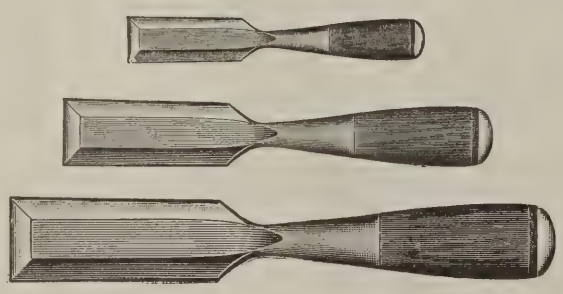
Manufactured by

HYDE-MURPHY COMPANY, Ridgway, Pa.

New York Office, 10 East 43d St.

Pittsburgh Office, Liberty Bank Bldg.

Stanley Tools



Stanley

"EVERLASTING" Chisels

STRONGEST—FASTEST—MOST DURABLE CHISELS MANUFACTURED.

Blade, Shank and Head One Piece of Steel.

Exceptionally Well Made and Highly Finished.

Made in all Standard Sizes.
Special Circular Upon Request.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

ings, etc., Martin and C. H. Lauerman conducting an enterprise that is growing, as is evidenced by the improvements recently completed.

Wood Turning Lathes

The subject of wood turning is one which is full of interest to the man who works in wood and the hand-turning lathe has never lost its fascination nor its

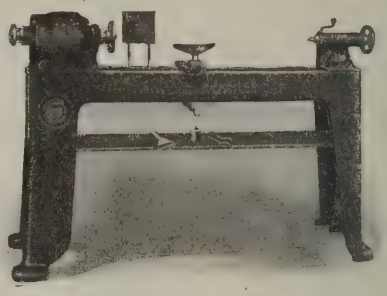


Fig. 7—The Model "A" Latne

utility. While automatic machines turn out duplicate patterns in great quantities, the hand-turning lathe is still indispensable in the pattern shop, or, for that matter, in any other woodworking shop where individual work is done. For the shop of the carpenter-contractor or builder, a lathe can be used to great advantage to turn out work that will give individuality to the job. Furthermore, during winter months it can be used to



Fig. 8—The Model "B"

advantage in working up odds and ends into novelties such as candle sticks, toys, etc., which can be sold at a profit during the holiday season. In order to meet the demand for an up-to-date speed lathe built on high duty machine tool lines with self-contained motor, that can be operated from a lighting circuit, the J. A. Fay & Egan Company, 221 to 241 Front Street, Cincinnati, Ohio, has brought out the machine illustrated herewith. It is known as the No. 400 series which embraces three

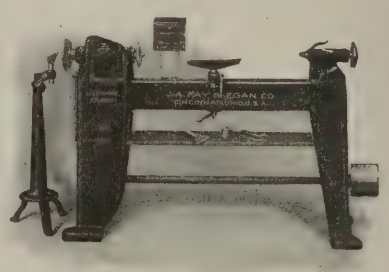


Fig. 9—Model "C" Wood Turning Lathe

different types. What is known as model "A" shown in Fig. 7 has variable speed motor headstock giving fifteen different speed changes by simply revolving an aluminum cylinder set in the leg. This type is available for use only on a direct current of 110 or 230 voltage. For an alternating current, the makers recommend model "B" shown in Fig. 8. This has the motor self-contained in the base and speed control by means of a single

(*Continued on page* 86)



Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

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It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

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Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name.....

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You don't buy saws often—get the best

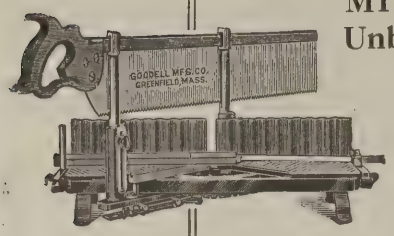
You use your saws daily, week in and week out. If they are fine tools they are a source of constant satisfaction and pleasure. Likewise they may be a perpetual annoyance. You owe yourself and your skill as a mechanic the best you can get. We think

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are the best made. The majority of saw users think as we do. If you have used them you are of the same opinion. But if you haven't, make it a point to get a Disston next time. Learn for yourself why they enjoy the world's greatest demand. It's all in the quality—workmanship, material, design. Write for our Hand Saw Booklet.

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GOODELL PRATT
1500 GOOD TOOLS



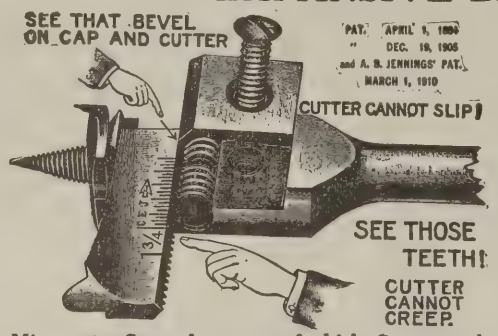
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Unbreakable

Many Special Features
Circular Free to You
Goodell-Pratt Company

Toolsmiths

Greenfield Mass., U. S. A.

C. E. JENNINGS STEERS PATENT
EXPANSIVE BIT



Note Micrometer Screw, by means of which, Cutter can be instantly adjusted to a Thousandth part of an inch.

C. E. JENNINGS & CO. Sole Mfrs. 71-73 Murray St., N. Y.

The word "WHALEBONE" before Wall Ties means a permanent construction when placed.

Don't order Wall Ties from your dealer. Order Whalebone Wall Ties and get the best.



Standard size for solid or veneer walls 7 x ⅞", weighing 50 pounds to the thousand.
If your dealer can't furnish "Whalebone," wire us at our expense the following:
(Name of dealer) can't furnish Whalebone, (Express, Freight) (number) boxes. (Your name).
We will ship the same day from our factory or from the nearest dealer handling the Whalebone and guarantee satisfaction in every respect.

Allegheny Steel Band Co., 886-888 Progress St. Pittsburgh, Pa.



Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, acauat load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

THE W. J. CLARK CO., Salem, Ohio, U. S. A.

handle, located at the front of the machine. In Fig. 9 is shown type "C," which is exactly like type "B" except in place of the built-in motor it has a self-contained countershaft so that it may be driven from any shaft. This series of lathes is made regularly to swing 12 in. over the ways. Large diameters can be handled by means of outside face plate, floor stand and rest. The beds are made at any length from 4 ft. upward. The 4-ft. size takes 24 in. between centers and each additional foot added to the length of the bed adds 12 in. to this distance between centers. The point is made that the totally inclosed construction of these machines eliminates accidents, keeps the operating parts clean, reduces power and in general tends toward entirely satisfactory operation.

A New Sanding Machine

A sanding machine involving many interesting features and which is especially intended for removing varnish from counters, tables, desk tops, and for dressing up new work, is the automatic electric surfacing machine which has recently been placed on the market by Wayvell Chappell & Company, 358 West Madison Street, Chicago, Ill., and a general view of which is presented in Fig. 10 of the accompanying engravings. The machine is of such size as to be readily handled and by using coarse sand paper first, the old varnish is readily taken off clean from the wood. The finishing with a finer grade results in a surface that is smooth and attractive. The company is also calling attention to its improved type of automatic ball bearing electric floor surfacer, the improvement in which is the mounting of the sanding roller in such a way that one end extends just beyond the side of the machine, thus securing uniform work throughout the room and close up to the base board. The point is made that this improvement in the sanding machine does away with the border work which formerly resulted when a narrow edge roller attachment was used. The sanding roller may be quickly changed to the other side of the machine when needed so that the wall all around the room can be easily reached.

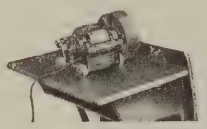


Fig. 10 — Showing the Sanding Machine in Use on a Desk Top

TRADE NOTES

The Sydney Tool Company, makers of woodworking machinery at Sydney, Ohio, has found it necessary to increase its manufacturing facilities and has under course of construction a two-story brick addition 60x 100 ft. in plan, which will be devoted entirely to the use of an erecting shop for the machine-tool department.

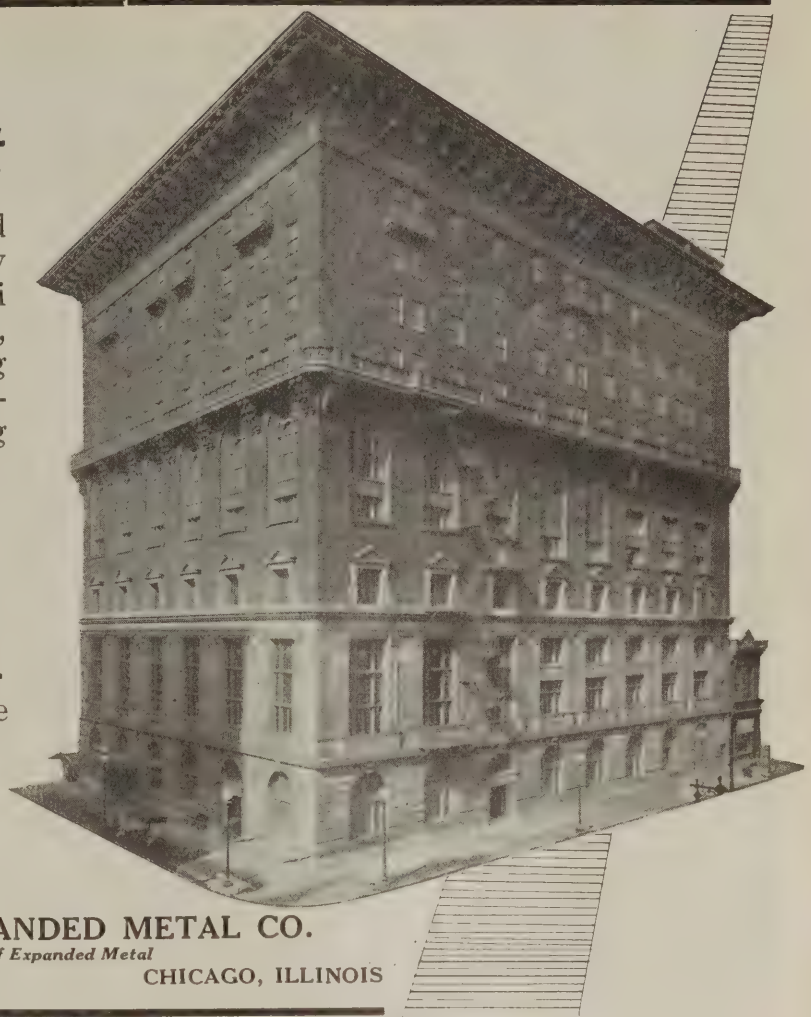
The cover of the November issue of *Graphite*, the house organ of the Joseph Dixon Crucible Co., Jersey City, N. J., contains a reproduction of "Eldorado," the master drawing pencil. Throughout the issue are scattered various interesting references to this pencil. In referring to the company's new building, it is said that over 25 miles of piles have been driven into the ground as part of the foundation for the new Dixon storage and stable building. The structure will be 210 x 199 ft. and three stories high. The piles are of Southern pine, are 1825 in number and average 75 ft. in depth.

One of the most valuable means by which the strength of a roofing material can be estimated is in its condition after being subjected to a severe climatic test in actual service. On Sept. 28 a severe tropical storm swept over the South, the wind reaching a velocity of 120 miles an hour. The house of P. C. Authement, Lockport, La., had just been roofed with J-M transite asbestos shingles, made by the H. W. Johns-Manville Co., 296 Madison Ave., New York City, and it is said that the roof was entirely free from damage, although practically every other roof in the city suffered injury of some sort.

(*Continued on page* 88)

The Lesson Fire Taught

The world will never be shocked and horrified again by the story of a fatal fire in the Missouri Athletic Association Building, for the beautiful new building shown herewith is an almost perfect example of fire-resisting construction.



Kno-Burn
Trade Mark Registered

Expanded Metal Lath

forms the base for all interior plastering. XXth Century type was used—acid resisting.

"Kno-Burn" is just as practical for use in the five room bungalow as in this big building. Send for Booklet 43 and find out how.

NORTH WESTERN EXPANDED METAL CO.
Manufacturers all Types of Expanded Metal
904 Old Colony Building CHICAGO, ILLINOIS



That Carborundum Niagara Grinder Puts New Life Into Any Edge Tools—

My plane bit for instance was way off—needed grinding. On one corner of my work bench is the ever handy Carborundum Niagara Grinder. A few turns and the bit is sharp—you never saw a wheel that cuts so clean and quick as that Carborundum Wheel. Every Niagara Grinder has one. ¶ Then a couple of rubs on a Carborundum sharpening stone and my plane bit has a keen, smooth edge that will stand up on the job. ¶ That Carborundum Niagara Grinder is a dandy tool. Easy and smooth running—well made—durable—every one of you fellows should have one.

Ask your hardware dealer. Send for the Carborundum catalog.

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

For the Sake of Your Reputation
Recommend
CON-SER-TEX



THE building roofed with CON-SER-TEX Canvas Roofing will do credit to your reputation.

CON-SER-TEX is a scientifically treated roofing canvas that wears like iron and gets the better of any kind of weather. It is easy to lay and hugs the surface tightly. More economical than any other floor or roof covering.

Write today for generous sample —see how it looks. Try it—see how it wears. An attractive booklet, "Roofing Facts and Figures," will be sent to you upon request.

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Philadelphia, Pa.
Owned and Operated by Nicholson File Company

"Concrete Swimming and Wading Pools and How to Build Them," is the title of a new booklet being sent out by the Portland Cement Association, 111 West Washington Street, Chicago, Ill. It contains much interesting information along lines indicated by its title; also numerous half-tone engravings of outdoor swimming pools, both public and private, together with diagrams of the proper construction of a wading and a swimming pool. We understand that any reader of THE BUILDING AGE can obtain a copy of this instructive little booklet free of charge upon application to the address above.

Universal Floor Scraper Company, 166 Union Street, Worcester, Mass., is directing the attention of carpenters and builders as well as others interested to the Universal floor scraper which is now being handled under a new management. The claim is made that better service is being given together with an important machine carrying the company's patent sharpening device. It is stated that over 3000 Universal floor scrapers are in daily use, and any reader interested can obtain full information regarding the device by writing to the address given above.

That oak as a flooring material is well and favorably regarded is evidenced by the number of houses in which it has been laid both when the house was built and in remodeling, the ⅜-in. thick flooring being often laid directly over old floors of other material. The merits of oak flooring are set forth in a circular letter of the Oak Flooring Service Bureau, 1349 Conway Building, Chicago, Ill. On the reverse side of the letter is a reproduction from Sweet's 1916 catalog giving various items of information concerning oak flooring.

Henry Disston & Sons, Inc., Tacony, Philadelphia, have awarded contract to the Austin Company, 53 Transportation Building, Philadelphia, for the erection of a one-story concrete and steel machine shop, 73 x 150 ft., at Unruh Street, east of State Road, at an estimated cost of $29,000.

The H. W. Johns-Manville Company has just opened a new branch office on the fourth floor of the Ford Building in Great Falls, Mont., this increasing the company's branches to 55 in number. The new branch is in charge of J. H. Roe.

An interesting 24-page booklet devoted to general rules and suggestions for the erection of Star section galvanized iron lightning rods, has been issued by Reyburn, Hunter & Co., Philadelphia, Pa., and Chicago, Ill. Seventeen of the pages are devoted to roof plans which are presented to illustrate the methods employed in connecting the rods and also the groundings. These drawings cover a variety of buildings and include residences, barns, silos and a church.

One of the late publications of the Portland Cement Association, 111 West Washington Street, Chicago, Ill., is entitled "Concrete Linings for Irrigation Canals." Much interesting information along lines suggested by the title is contained, and we understand that any reader of THE BUILDING AGE may obtain a free copy by applying to the above address.

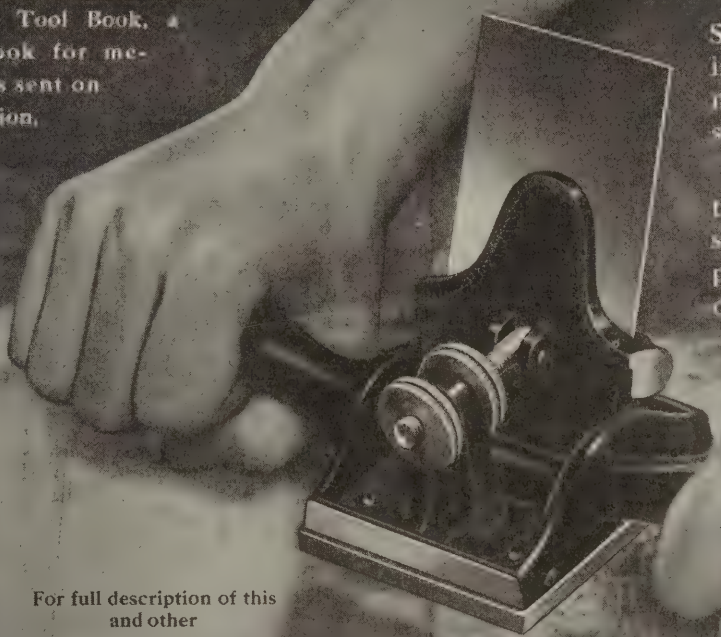
One of the interesting exhibits at the Country Life Permanent Exposition at the Grand Central Terminal, New York City, is a unique eight-room bungalow constructed entirely of North Carolina pine by the North Carolina Pine Association, Norfolk, Va.

Much of the appearance of a house depends on the way it is painted, and in the September issue of *The Carter Times* there are several articles containing valuable information relative thereto. It is undoubtedly true that painting efficiency depends greatly upon the

(*Continued on page* 90)

SARGENT

Other Sargent Quality Tools are described in the Sargent Tool Book, a handbook for mechanics sent on application.



No. 53.

A light floor and veneer Scraper. The clamp binding screw is steel and will not strip. Wood face lessens friction.

A useful and convenient tool. If your dealer cannot supply you, we will send prepaid, on receipt of $1.75.

For full description of this and other

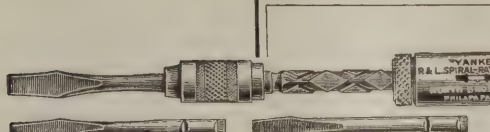
SARGENT WARRANTED PLANES

SEND FOR SARGENT PLANE BOOKLET

SARGENT & COMPANY

Makers of Squares, Planes and Mechanics' Tools

53 Water St. New Haven, Conn.



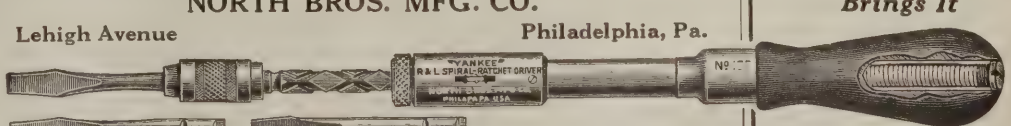
YANKEE No. 135

Send for the YANKEE Book A Postal Brings It

A NEW "YANKEE" TOOL for smaller screws. A quick and convenient driver for carpenters, cabinet makers, electricians and all mechanics who frequently have a large number of small screws to drive. The spring in the handle drives it back quickly for the next thrust and holds it extended, making it a very excellent tool for overhead work or in tight places where other screw drivers will not reach. Your dealer will supply you.

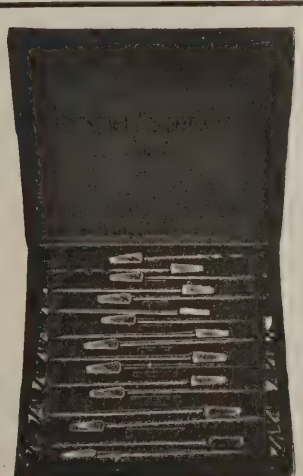
NORTH BROS. MFG. CO.

Lehigh Avenue Philadelphia, Pa.



YANKEE No. 135

Send for the YANKEE Book A Postal Brings It

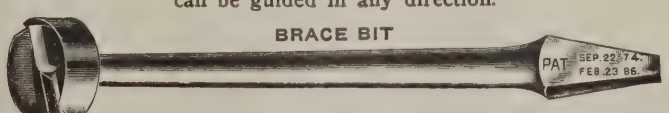


THE "FORSTNER" LABOR SAVING AUGER BIT

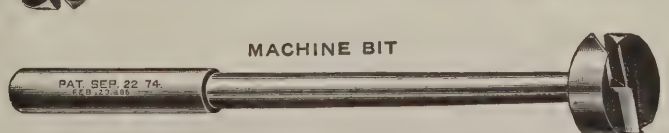
BORES ANY ARC OF A CIRCLE

As it is guided by its circular rim instead of its center, and can be guided in any direction.

BRACE BIT

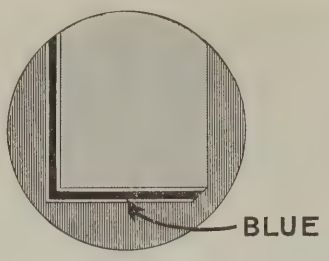


MACHINE BIT



Unequalled for fine carpenter, cabinet and pattern work. Specially adapted for hard wood working and against difficult grain and knots. Special prices in full sets.

THE PROGRESSIVE MFG. CO., Torrington, Conn.



"NOT ONE COMPLAINT TO 2,000,000 FEET SOLD AND USED"

The DEPENDABLE Wall Board with the BLUE Center will SATISFY your customers

THE color in itself doesn't mean a blessed thing. When we created the color center in wall board five years ago, instead of blue we could have used pea-green or salmon-pink, so far as affecting the quality of the board was concerned. We didn't use color to hide old, re-worked materials or cheap, dirty fibers. Upson Board is, and always has been made only of highest-grade **pure** wood fibers. Nor did we use cheap, smudgy dyes which may blacken or stain the floors when the sawdust cuttings are tracked 'round. We **originated** the idea of a wall board with the distinctive construction of two light-colored faces and colored center simply as a ready means of identification and protection to buyers. There is no physical reason that we know of for making any board with a colored center—**no** reason, in fact, unless it is to approximate the construction of dependable Upson Processed Board.

It is what the color STANDS FOR that counts. The BLUE Center means that you are not getting a mere imitation of another board. The BLUE Center is the mark of genuine UPSON PROCESSED BOARD.

THE BOARD WHOSE MAKERS **ORIGINATED** NEARLY EVERY WORTHWHILE IMPROVEMENT AND INNOVATION IN WALL BOARD DURING THE PAST **FIVE** YEARS.

Upson Board is the board that stands squarely on its RECORD. **Not one complaint to two million feet sold and used!**—and used in every form of building construction, including some of the most important building jobs in the country.

It is the wall board that has proved to the carpenter and builder that there IS a DEPENDABLE wall board—quick and easy to install and giving lasting satisfaction when it **is** installed.

The BLUE CENTER is important because it stands for YOUR PROTECTION. We originated it so that you could instantly identify Upson Processed Board and be fully protected against imitations. For this reason, too, we were obliged to go to law and have Upson Processed Board legally established as the one wall board that has a right to the blue center.

DO NOT BE CONFUSED by imitations using centers of other colors. If a board hasn't the BLUE center, it isn't genuine Upson Processed Board.

Upson Processed Board is made good to make good. It is **honestly made and honestly sold on its own merits,** and we are proud to attach our own name to it.

Send for free booklet, samples and full information.

THE UPSON COMPANY

Fiber Board Authorities

20 Upson Point Lockport, N. Y.

UPSON PROCESSED BOARD

LOOK FOR THE FAMOUS BLUE CENTER

mixing, and the proper method of doing this is interestingly told in "The Better Way to Mix Paint." Another worth-while article is "White Lead as a Vehicle Surfacer," and additional information concerning the best method to break up white lead is found later in the issue. Those of our readers who are interested in painters' wages will find a table covering the hourly wage, number of hours constituting a day's work, overtime, etc., in different parts of the United States. The issue is an excellent one and these are only a few of the many things contained of interest and value. A copy may be obtained by readers of THE BUILDING AGE, free of charge, upon application to the Carter White Lead Co., Chicago, Ill.

The use of sheet metal on farm buildings is growing because of the fact that the farmer is realizing that it is a wise investment to insure his structures against early deterioration and loss from fire by lightning when the buildings are erected. The application of sheet metal to old frame buildings is also a source of profit to the contractor, and it is economy to buy high-grade materials. In this connection a profusely illustrated catalog of 184 pages issued by the Berger Mfg. Co., Canton, Ohio, is of especial interest, as it shows an extensive line of sheets for roofing and siding, as well as eaves trough, ventilators, shingles, etc. All metal products are guaranteed because of the exceptional facilities offered by the operation of its own steel plant, rolling mills, galvanizing plant, etc., that enable the company not only to control the quality in every progressive stage from ore to finished product, but to effect economy in the cost of production.

Builders who are investigating the merits of asphalt shingles will be interested to learn that Bird & Son, Dept. B., East Walpole, Mass., are distributing miniature samples of their new process built-up Neponset Twin shingle. The sample is sent out between covers upon which are contained various items of information concerning the shingles. There is also a page containing on one side reproductions in colors of shades in which the shingles are furnished and on the other a colored cross sectional view showing the construction.

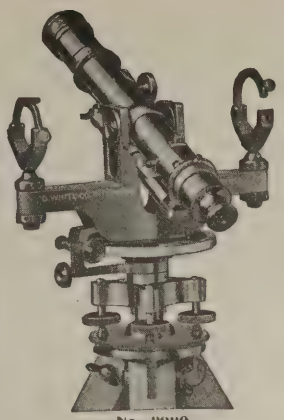
George Rhines, formerly with Crane Company, Chicago, and later manager of Stanley G. Flagg & Co., has been appointed secretary of the Allith-Prouty Co., Danville, Ill., and F. C. McClimans, for several years in the Chicago office and later with the Payson Mfg. Co., has been appointed sales manager for the Danville concern.

It is interesting to note that "Medusa" white Portland Cement was selected for use in connection with the latest improvements made to Buckingham Palace, the residence of the Kings of England, now occupied by George V., and in the erection of the Queen Victoria Memorial.

The Pyrolin Products Co., Inc., Fort Dodge, Iowa, has issued an interesting 32-page book which describes the features of "Pyrolin" fire-resisting linseed oil paints and products. It contains abundant evidence that a building treated with this paint will successfully resist fire, no matter how fierce the flame may be. Information is also contained in a separate folder on "Pyrolin" shingle stains, which are said to be the only kind containing linseed oil, creosote and fireproofing. They are made in six colors, and about four hundred shingles can be stained with one gallon, or from 150 to 200 sq. ft. per gallon when applied with a brush. The company will send any reader of THE BUILDING AGE copies of these interesting publications on application.

Contractors and builders having a preference for solid concrete silos will be interested in the 48-page catalog issued by the Monolithic Silo & Construction Co., Chicago, Ill., and which illustrates and describes "Monsco" steel silo molds. With this equipment the concrete is poured into the mold, which, after the contents have thoroughly set, is raised and the process repeated, re-

(*Continued on page* 92)



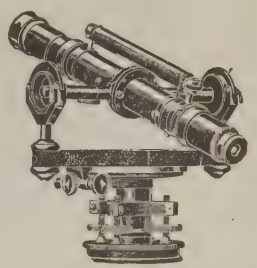
No. 2020

Something New!

This new convertible level is a big improvement over the old style instrument with detachable standards. Can be converted into transit while you count ten. Not only saves time but cuts out confusing adjustments. Most compact, durable and accurate convertible level on market today. Write now for detailed description, price, etc., and get posted on this up-to-date instrument for up-to-date contractors.

DAVID WHITE CO., (Inc.) 421 E. Water St. MILWAUKEE, WIS.

KOLESCH "Builders" Tilting Level No. 7850



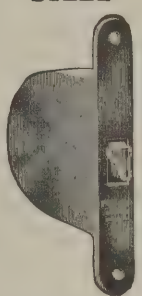
Designed particularly for the leveling and plumbing of walls, giving lines and levels for buildings, laying out angles, grading streets, sewers, drains, etc.

Sturdily built for durability, yet sensitively accurate. Sold complete in a polished box with plumb bob, adjusting pins, metal trivet, book of instructions, and tripod for $57.50.

KOLESCH & COMPANY
138 Fulton Street, New York, N. Y.

Pullman
ALL STEEL **Unit Sash Balances**

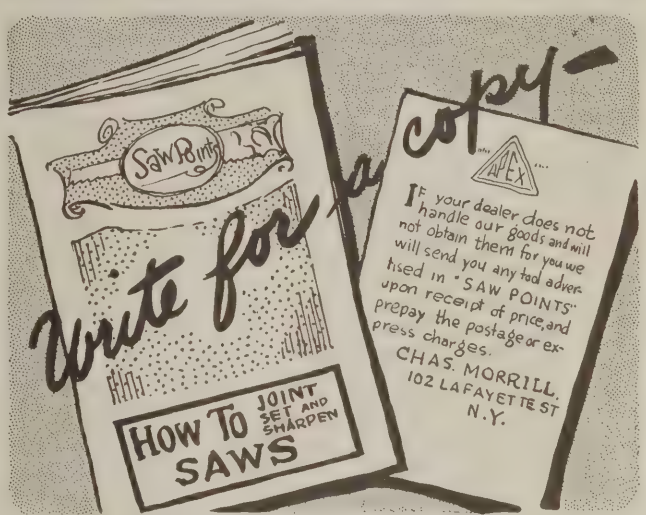
Noiseless



Is the word that describes the operation of the Pullman Unit Sash Balance. All parts are in the casing—nothing can rub or interfere with the spring action. There is nothing to squeak, rattle, bang or stick. Once installed and it will never require contractors', builders' or architects' attention. There is in every Pullman Sash Balance satisfaction for owner and builder alike. Guaranteed for 10 years.

Our catalog with blue print gives full particulars. May we send one?

Pullman Mfg. Co., 8 Industrial Street Rochester, N. Y.



This Is Building Time

Soon there will be a demand in all localities for men to build new barns.

This call is welcomed by the contractor who uses *PORTER SERVICE*, since he knows he can build the new barn in double-quick time and guarantee a thoroughly modern and workmanlike job.

Consider what it means to receive authentic and practical data covering the construction, arrangement, ventilation, etc., of each *individual* barn. That's what *PORTER SERVICE* renders—and it's *FREE*.

SERVICE
that which identifies
PORTER BARN EQUIPMENT

The name *PORTER* is identified with that practical and durable kind of *BARN EQUIPMENT*.

J. E. PORTER CO.
638 Fremont Street, OTTAWA, ILL.

HESS MEDICINE SANITARY CABINET LOCKER

The Only Modern, Sanitary STEEL Medicine Cabinet



or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Costs Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

Four styles — four sizes. To recess in wall or to hang outside.



The Recessed Steel Medicine Cabinet — The Outside Steel Cabinet

Send for Illustrated Circular

HESS, 1201-L Tacoma Building, CHICAGO
Makers of Steel Furnaces. Free Booklet

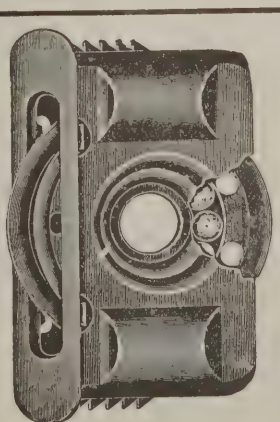


WEATHER VANES

ALL SIZES AND DESIGNS

SEND FOR CATALOGUE

E. G. Washburne & Co. 208 Fulton Street New York



No. 10 Ball Bearings

"Grand Rapids" All Steel Sash Pulleys

Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

Grand Rapids Hardware Co., 160 Eleventh Street, Grand Rapids, Mich.

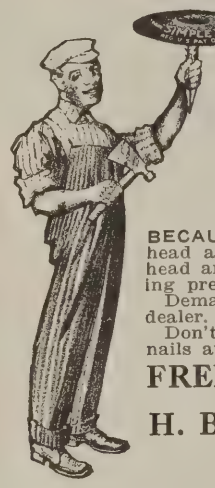
F. E. MYERS & BRO.



MYERS FAULTLESS DOOR HANGERS

Push and Pull easiest because of the continuous opening between the track, cover and building. No possible chance for dust, dirt, snow or ice to accumulate and interfere with the free movement of the door at any time. The extra heavy covering is a complete protection to the door and hanger. Circulars of our Faultless or other styles sent upon request.

ASHLAND PUMP AND HAY TOOL WORKS, Ashland, Ohio



TRADE SIMPLEX MARK
Reg U. S. Pat. Office

ROOFING NAILS

FOUR NAILS at PRICE OF ONE
when you buy them

ONE NAIL in Place of FOUR
when you drive them

BECAUSE the Simplex has four times the head area of an ordinary roofing nail, and head area is the all important point in laying prepared roofing or sheathing papers.

Demand Simplex nails from your hardware dealer.

Don't buy prepared roofing unless Simplex nails are packed in the rolls.

FREE Samples sent on receipt of request accompanied by dealer's name.

H. B. SHERMAN MFG. CO.
Battle Creek, Mich.

Pearson's Automatic Shingle Nailer



Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB



Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 8d galvanized No. 13 gauge 1¼ inch wire nails.
List price $7.00 (*but an order from this ad will bring you either size by prepaid parcel post for only Five Dollars*).

Pearson Mfg. Co.
Robbinsdale, Minnesota
Makers of Hand Nailing and Tacking Tools

MACK & CO.



YOU will always feel secure when you use Barton Planes and Edge Tools. The making of keen edged tools that hold their sharpness is our hobby. If your dealer won't supply you we will.
There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

Brown's Race & Platt St., Rochester, N.Y.

sulting in a single homogeneous structure. The outfit comprises a mold, scaffold hoist and bucket, with a system of cold-drawn mesh reinforcement. In addition to several articles on silos, there are tables of silo capacities and material requirements for silos of various sizes.

The first and only motor truck ever owned in the Bahama Islands is a Federal. It is used on the Island of New Providence to haul pineapples from a plantation to Nassau.

The Monitor line of sheet metal products, made by B. F. Lichty & Sons Co., Waterloo, Iowa, is treated in Catalog B that is being sent to contractors and builders throughout the country. Considerable space is given to a description of cupolas, and mention is made that they are shipped assembled with the exception of the top, which is easily bolted in place, which effects a saving in labor and insures a more substantial job. Details of construction are presented and the subject of proper ventilation of farm structures is handled intelligently. The company also manufactures skylights in nine sizes, which are described and illustrated.

The door problem is always an interesting one, whether it be for the closing of openings in the house, garage or barn, for the method used must necessarily be convenient and economical, and a knowledge of the various door equipments is therefore of value. Several booklets bearing upon this subject are being distributed by the Richards-Wilcox Co., Aurora, Ill., and embrace "R-W House Door Hangers," "Garage Door Hardware," "Doorhangers, Grindstones and Hardware Specialties," together with folders upon similar subjects. Illustrations, both halftone and line cuts, show the fixtures and their construction. The text gives various items of information concerning these products, and the booklets will doubtless prove of reference value to many.

There are several types of chain drives upon the market, each of which is adapted to some particular use, but the average layman is not generally acquainted with the construction and action of these various types. To show just why the particular kind of silent high-speed chain-drive is used upon the American Universal Floor Surfacer, made by the American Floor Surfacing Machine Co., 521 South St. Clair Street, Toledo, Ohio, the company is sending forth a folder by H. H. Wolfe, M. E., illustrating and describing chain types. The folder is entitled "Why a Silent High-Speed Chain Drive Is Used on the American Universal Floor Surfacer."

FOR SALE

One No. 404 Lidgerwood Electric Hoist rated at 7½ H.P. with CO-2504 motor, with single friction drum 12 in. diameter, 15 in. face. Requires floor space of 34" x 43½". This hoist has never been used.

Agency of CANADIAN CAR & FOUNDRY CO., Ltd.
120 BROADWAY, NEW YORK

Decorative Concrete

Better Looking, Better Selling Products
With Your Present Equipment

We have no machinery or materials to sell—simply the process and formulas for making high grade decorative concrete. Exact reproductions of Marble, Granite, Onyx, etc., at ¼ the cost of actual marble. Block Facings, Porch Work, Composition Flooring, Interior and Exterior Trim, Mantles, etc.

You can make Art Marble Wainscoting, Tiling and Composition Floors for a Hall, Vestibule, Bath or Fire Place almost as cheap as hard wood.

ART STONE CO., Box 500 Waynesboro, Pa.

B CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE

JAN 3 1916



JANUARY, 1916 PRICE 20 CENTS



Are You Interested in the Roofing Question?

Imagine an Asphalt Shingle
That is fire resisting.
That will not leak or blow off.
That will not Rust, Rot, or Split.
That will not crack or absorb Moisture.
That is Artistic, Durable and Economical.
That is Easily laid by carpenters.
That is finished in Red and Green and needs no paint or stain.

These are some of the unusual points of excellence that have won for Hudson Asphalt Shingles, National recognition as the Perfect Roofing Material.

We will send postpaid samples of Hudson Shingles and free copy of our book "Shingling & Roofing." Ask for Shingling Aids No. 52.

HUDSON

ASPHALT READY ROOFING CO.
Room 452, 9 Church Street
New York, N. Y.

Yes, Mr. Contractor

You can lay Wood-Mosaic Floors of Hardwood. Our 5/16" Flooring can be laid in old houses as well as new. We make all kinds and thicknesses; Wood-carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-Groove Flooring.

On receipt of accurate measurements of rooms, we will furnish colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

WOOD-MOSAIC FLOORING

Send for a free copy of our catalogue in natural wood colors

Wood-Mosaic Company

32 Hebard Street Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.

CONCRETE and stucco can be made beautiful with Bay State Brick and Cement Coating—can be given a rich, artistic finish in harmony with the architect's ideas. This overcomes the dreary blue-gray and makes an attractive white or tinted wall.

Bay State Brick and Cement Coating

has another great advantage—it's absolutely waterproof. It fills the porous cement and prevents water seeping through. As an interior finish, nothing compares with Bay State. It resists fire, steam, acid and water—reflects the light and will not peel or dust off.



Builders and architects everywhere indorse it. We'll send A SAMPLE CAN, FREE if you'll try it. When you write, say what tint and ask for Booklet 19.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.

New York Office:
Architects' Building

IMPORTANT

Rex Strip Shingles are 40 inches long and 10 inches wide. The "slots" or "cut-outs" are ½ inch wide and 4 inches deep. There are 5 shingles to a strip. Only 90 strips are required to cover 100 square feet of surface.



REX STRIP SHINGLES
RED SLATE SURFACED GREEN

They go on the roof five at a time and save money for close-figuring carpenters and builders.

Send for samples and prices

FLINTKOTE MFG. COMPANY, INC.
98 Pearl Street, Boston, Mass.
68 Beaver St., New York
651 Peoples Gas Bldg., Chicago

CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



FEBRUARY, 1916

PRICE 20 CENTS



Residence of William Finch, Esq., Cos Cob., Conn.
B. E. Schubert, Greenwich, Conn., Builder.
Roofed with Green Hudson Asphalt Shingles.

THERE'S THE ROOF YOU NEED Right Now

HUDSON SHINGLES

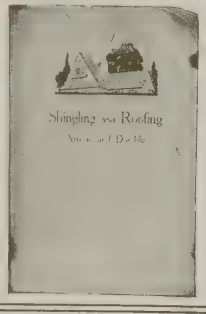
Slate-Surfaced in Red and Green Beautify the Home

Their cost is reasonable. They need no paint or stain and make a permanent, leakproof, fadeless and fire-resisting roof. Send for this book—describing some functions of the roof you may not have heard of—also

How to Apply Asphalt Shingles

to get the most artistic and durable effect by the Boston Hip and other methods.

Send for "Shingling Aids" 52



Asphalt Ready Roofing Co.

HUDSON ASPHALT ROOFING PRODUCTS

Room 452
9 Church Street
New York, N. Y.

Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company

32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.

Weatherproof Walls

Concrete and stucco are porous. Rain and snow make a wall blotchy and unsightly. But this, the only serious drawback to the greater use of these materials, is *easily overcome.* Two coats of

Bay State *Brick and Cement* Coating

will do the trick—will *absolutely weatherproof* concrete, stucco, plain cement and brick. "Bay State" comes in white and a variety of attractive tints. It is for all kinds of buildings, houses, bungalows, schools, mills and factories. Also, for interiors—it "Lights Like the Sun."

This panel shows why ordinary cement absorbs water.



Sample can free—say what tint you prefer. Ask for booklet 19.

WADSWORTH, HOWLAND & COMPANY, Inc.

Paint and Varnish Makers

BOSTON, MASS.

NEW YORK OFFICE
Architects' Bldg.



Breaking All Records

Yes, sir, builders using Rex Strip Shingles are breaking all shingling records. No one using individual shingles can compete with them. This is one reason why every user of Rex Strip Shingles is an enthusiastic booster. When *you* once try them, *you* too, will use nothing else.

Send for free samples. You will be glad you did. Write

FLINTKOTE MFG. CO.

Boston, Mass.

98 Pearl Street, Boston, Mass.
68 Beaver Street, New York, N. Y.
651 Peoples Gas Building, Chicago, Ill.

CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



MARCH, 1916

PRICE 20 CENTS

Eighty per cent. of the Railroads entering New York and many others use

HUDSON ASPHALT ROOFING PRODUCTS TRADE MARK

i.e.:

Protection Brand Roofing O
Mineral surfaced. Has 6-inch lap (Pat. Nov. 18—02). Laid with all nails covered. Joints absolutely tight.

Hudson Asphalt Shingles O
Slate surfaced (Red or Green). Artistic, Durable, Economical.

Rockland Roofing O
Mineral surfaced. Red, Green and Gray.

Arrow Brand Roofing O
Sand or Gravel surfaced.

Hudson Brand Asphalt Felts O
For sheathing buildings. For reinforcing Slate and Tile Roofs.

Materials used by Railroads are very carefully selected for merit, quality and reputation for the service which they have given in the past. If you want samples of roofings and shingles which are reliable and which will protect as well as beautify the houses which you are building, just cut out this advertisement, write your name and address on the bottom lines, and send it to

ASPHALT READY ROOFING CO.
Room 452, 9 Church Street **New York**

Name .....
Address .....
.....

Put an X in the circle O opposite the materials which you are interested in.

Wood-Mosaic Hardwood Floors

WOOD-MOSAIC FLOORING TRADE MARK REG. U.S. PAT. OFF.

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company

32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.



TO bring out the **beauty** of concrete or stucco, finish with Bay State Brick and Cement Coating. This Coating makes possible a variety of rich, artistic wall effects in white or tints.

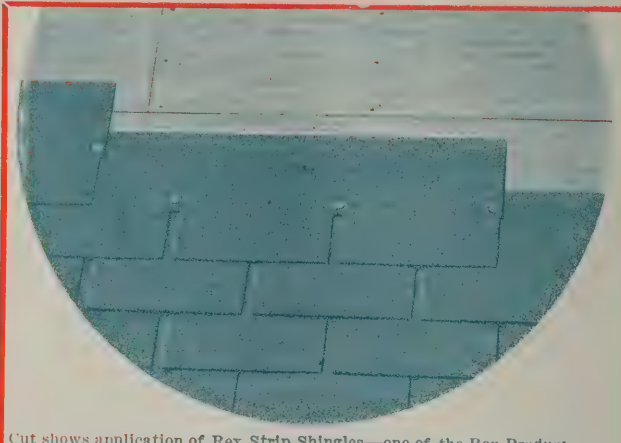
Bay State *Brick and Cement* Coating

absolutely **weatherproofs** walls—it insures the permanence of concrete or stucco. Architects and builders in all parts of the country have proved it out for 16 years.

"Bay State" is for every type of building. It is made for interiors, too.

Sample can will be sent **free.** Say what tint you prefer and ask for booklet 19.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.
New York Office, Architects' Building



Cut shows application of Rex Strip Shingles—one of the Rex Products.

Send for Our Roofing Catalog

(The largest and most complete ever printed)

The *Rex Products* catalog contains 112 pages and more than 180 pictures and illustrations. Besides complete instructions for laying all styles of asphalt shingles and prepared roofings, you will find in it a full description of each one of the 27 different *Rex Products* which we manufacture. You will also find much helpful information about slate, tile, asbestos shingles, tin and corrugated steel roofings.

We will send you this splendid catalog and a set of samples without cost or obligation to you. Write—

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651 Peoples Gas Building, Chicago, Illinois
120 Broadway, New York, N. Y.

CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



APRIL, 1916

PRICE 20 CENTS

You Want These Life-Size Samples



If you ever write, or expect to write, specifications for shingles see that your office is supplied with these generous working samples of **Hudson Shingles,** both in red and in green. Your examination will tell you more about them than our talk. You can put them to your own tests, and the information you gain is sure to be to your advantage.

Write for them now—use the coupon if it helps—and we'll send the samples as pictured by return parcel-post. Get the matter off your mind and the information into your office by writing *now.*

HUDSON

ASPHALT READY ROOFING COMPANY

Room 452, 9 Church Street, New York City

Gentlemen:—Please send full-size working samples of red and green Hudson Shingles to

Name .....

Address .....

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Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16″ Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

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THE rich, artistic effects which were the feature of ancient Greek architecture are possible today. They may be easily achieved with concrete and stucco, finished with

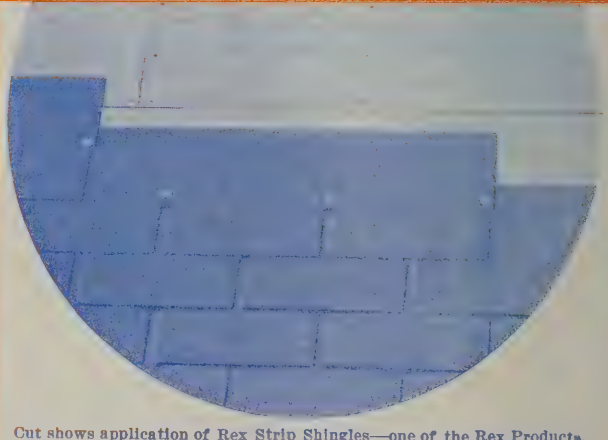
Bay State *Brick and Cement* Coating

It gives a dull surface in white and attractive tints, but doesn't hide the distinctive texture of concrete.

Bay State Coating, the *original,* also weatherproofs the walls. Architects and builders in all parts of the country have been using it for sixteen years. To realize the full possibilities of concrete for homes and bungalows, find out what Bay State Coating will do.

Trial Can *Free*—just write for it, specifying what tint you prefer. Ask for booklet 19.

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CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



MAY, 1916

PRICE 20 CENTS

A FORMER RAILROAD OFFICIAL

once connected with one of the large trunk lines, but on account of his fitness and ability, chosen by Uncle Sam to serve the Interstate Commerce Commission's Railway Valuation Department, was inspecting a railroad building in Maryland and saw therein some roofing labeled

HUDSON ASPHALT ROOFING PRODUCTS TRADE MARK

and said "Here is an old friend. That is the roofing which I found would stand up when I was railroading. Many a square have I specified and used with good results."

Protection Brand Roofing O
Mineral surfaced. Has 6-inch lap (Pat. Nov. 18-02). Laid with all nails covered. Joints absolutely tight.

Hudson Asphalt Shingles O
Slate surfaced (Red or Green). Artistic, Durable, Economical.

Rockland Roofing O
Mineral surfaced. Red, Green and Gray.

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Room 452, 9 Church Street New York

Name .....
Address .....
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Wood-Mosaic Hardwood Floors

WOOD-MOSAIC FLOORING TRADE MARK REGISTERED

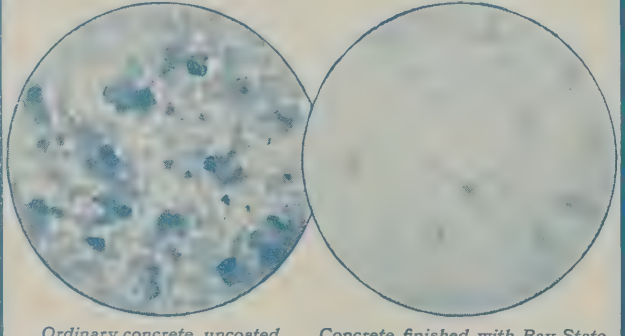
The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company
32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.



Ordinary concrete, uncoated, showing its porous character. *Concrete finished with Bay State Coating, making it waterproof.*

Building for Beauty

TO fully realize the possibilities of concrete and stucco, you should know the ideal effects which are get-able with

Bay State *Brick and Cement* Coating

This Coating overcomes the dull blue-gray of concrete. It gives a permanent finish in white or tint. It doesn't sacrifice the distinctive texture of concrete.

Also—Bay State Coating makes an absolutely weather-proof wall. Rain can't seep through the pores.

Architects and builders in all parts of the country have tested this, the original Bay State Coating. We'll be glad to pass along what they say of it. Write for booklet 19.

Or, test it yourself—we will send you a sample can of the original Bay State Coating free for the asking. Say what tint you prefer.

BAY STATE

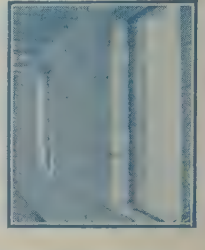
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Paint and Varnish Makers Boston, Mass.
New York Office: Architects' Building



VAN GUILDER HOLLOW WALL CONSTRUCTION

Built like a Thermos Bottle

with double monolithic walls from footing to roof plate, tied together and reinforced, and continuous air space everywhere.



The Van Guilder Hollow Wall Concrete Machines

lower the cost of construction by eliminating the making and re-handling of materials, and economize on skilled labor.

The Immediate Releasing System



permits the work to go on continuously—no waiting for concrete to set.

Our catalog is packed with profitable information. It also shows the machines for building Ice Houses, Silos, Cold Storage Plants, etc.

Copies sent you on request.

Van Guilder Hollow Wall Co.
712 Chamber of Commerce Bldg.
ROCHESTER, N. Y.

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CONTAINING COLORED SUPPLEMENT WITH PLANS

BUILDING AGE



JUNE, 1916

PRICE 20 CENTS

HUDSON ASPHALT SHINGLES

Make Happy Owners and Happy Contractors

That is what Hudson Asphalt Shingles will do. They give the owner a rain-proof, snow-proof and sun-proof roof that is fire-resisting. No cracking, no curling, no painting, no staining.

In addition to wearing well, a roof made of Hudson Asphalt Shingles looks well. It is a Constant Advertisement for the contractor. You will be proud of such a roof. Either Green, Red or Mottled.

Write for our Free Samples. Examine them yourself. Then you will use them.

Asphalt Ready Roofing Co.
Dept. 52, 9 Church St.
New York City

Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company
32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.



TO bring out the **beauty** of concrete or stucco, finish with Bay State Brick and Cement Coating. This Coating makes possible a variety of rich, artistic wall effects in white or tints.

Bay State *Brick and Cement* **Coating**

absolutely **weatherproofs** walls—it insures the permanence of concrete or stucco. Architects and builders in all parts of the country have proved it out for 16 years.

"Bay State" is for every type of building. It is made for interiors, too.

Sample can will be sent **free.** Say what tint you prefer and ask for booklet 19.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.
New York Office, Architects' Building



Revolutionizing Building Methods

The Van Guilder Immediate Releasing Hollow Wall Machine makes continuous work on a building possible, no cessation of work. One handling of the material places it on the wall.

No matter how many angles or bays you want, you can take care of every cubic inch with this equipment. One Van Guilder Hollow Wall outfit is good for years. No need of buying expensive form lumber.

If you are interested in lowering the cost to you and your customers use the Van Guilder Hollow Wall Concrete Machines. Why not read more about the Van Guilder System? We will send catalog on request.

"Built like a Thermos Bottle"

Van Guilder Hollow Wall Co.
712 Chamber of Commerce Building
Rochester N. Y.

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BUILDING AGE



JULY, 1916

PRICE 20 CENTS

HUDSON

TREAT THE OWNER RIGHT

Cover the Roofs With

HUDSON ASPHALT SHINGLES

that will not rot, rust or crack, that will not catch fire from sparks: Beautiful, natural, unfading colors. No painting or staining.

Mineral surfaced, Red, Green, Brown or Mottled, furnished in Individual Shingles or in Strips, which greatly reduce the labor expense, requiring only 6 nails to lay 5 shingles.

Send for free samples and book, "Shingling & Roofing," today.

Asphalt Ready Roofing Co.
Dept. 52, 9 Church Street, New York



Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company
32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.

CONCRETE and stucco can be made beautiful with Bay State Brick and Cement Coating—can be given a rich, artistic finish in harmony with the architect's ideas. This overcomes the dreary blue-gray and makes an attractive white or tinted wall.

Bay State Brick and Cement Coating

has another great advantage—it's absolutely waterproof. It fills the porous cement and prevents water seeping through. As an interior finish, nothing compares with Bay State. It resists fire, steam, acid and water—reflects the light and will not peel or dust off.



Builders and architects everywhere indorse it. We'll send A SAMPLE CAN, FREE if you'll try it. When you write, say what tint and ask for Booklet 19.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
Boston, Mass.

New York Office:
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Van Guilder Hollow
Wall Co.

Here's the Kansas City residence of F. I. Williamson, Vice-President and Sales Manager of the Dewey Portland Cement Company—built with a Van Guilder Hollow Wall Machine—in other words, "Built Like a Thermos Bottle."

Van Guilder Hollow Wall Machines

Comprise form work for a whole building. Carry it all on a wheelbarrow. Build wall with continuous air space—take care of all angles, returns, bays, etc. You can make money with this outfit—ask for details.

Van Guilder Hollow Wall Co.
712 Chamber of Commerce Bldg., Rochester, N. Y.

· BUILDING AGE ·



AUGUST, 1916

PRICE 20 CENTS

HUDSON

TREAT THE OWNER RIGHT

Cover the Roofs - With

HUDSON ASPHALT SHINGLES

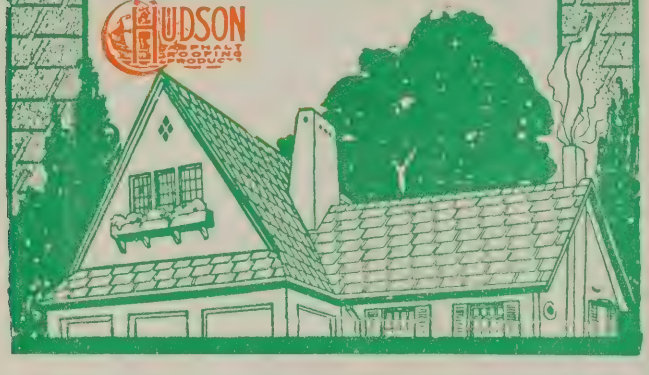
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Send for free samples and book, "Shingling & Roofing," today.

Asphalt Ready Roofing Co.

Dept. 82, 9 Church Street, New York



Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses; Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

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Saw Mill and Flooring Factory, New Albany, Ind.
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Weatherproof Walls

Concrete and stucco are porous. Rain and snow make a wall blotchy and unsightly. But this, the only serious drawback to the greater use of these materials, is *easily overcome.* Two coats of

Bay State *Brick and Cement* **Coating**

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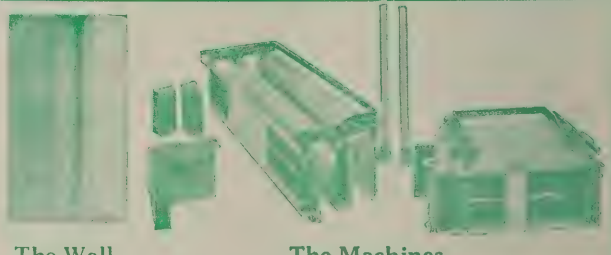
WADSWORTH, HOWLAND, & COMPANY, Inc.

Paint and Varnish Makers

BOSTON, MASS.

NEW YORK OFFICE
Architects' Bldg.





The Wall

The wall is hollow — built like a thermos bottle—perfect insulation — warm in winter — cool in summer.

The Machines

Our 1916 Flexible Sliding Plate and Angle Iron Corner System insures absolutely plumb buildings with corners of any angle—the most perfect concrete building system in the world.

The Van Guilder machines cut out one-half the labor. The steel reinforced walls cost no more completed than hollow blocks cost before they are laid.

Get the Big End of the Building Business

Think what it would mean to you if you were equipped to build concrete houses for only a little more than your competitor charges for building wooden houses. Think what it would mean to be able to do this without continually buying lumber for wood forms or having a car load of old-fashioned steel forms to take care of and move from job to job. Buy the

Van Guilder Hollow Wall Machines

A machine builds a course of hollow wall 9 inches high at each operation, using semi-wet mix. It is then moved ahead and filled again. When the job is done, you have a house within a house, the two walls being completely separated by a blanket air space. The machines have been used successfully in all parts of the country on big and little construction. It is remarkable the amount of wall you can run up in a day with the forms that you can carry on a wheelbarrow. Write for booklet containing full details.

VAN GUILDER HOLLOW WALL CO.

712 Chamber of Commerce Bldg., ROCHESTER, N.Y.

CONTAINING COLORED SUPPLEMENT WITH PLANS

· BUILDING AGE ·

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SEP 1 - 1916



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Eight out of **Ten Railroads** entering New York, and many others, use

HUDSON ASPHALT ROOFING PRODUCTS

Protection Brand Roofing O
Mineral surfaced. Has 6-inch lap (Pat. Nov. 18—02). Laid with all nails covered. Joints absolutely tight.

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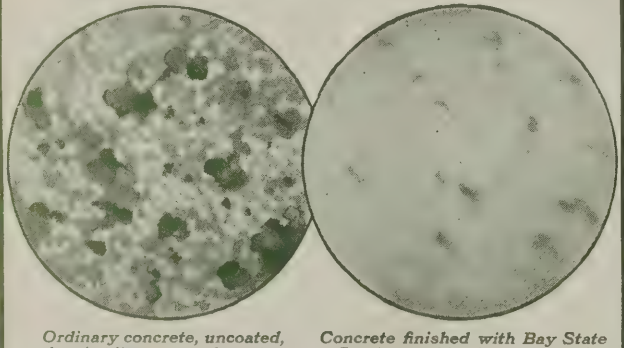
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Ordinary concrete, uncoated, showing its porous character. *Concrete finished with Bay State Coating, making it waterproof.*

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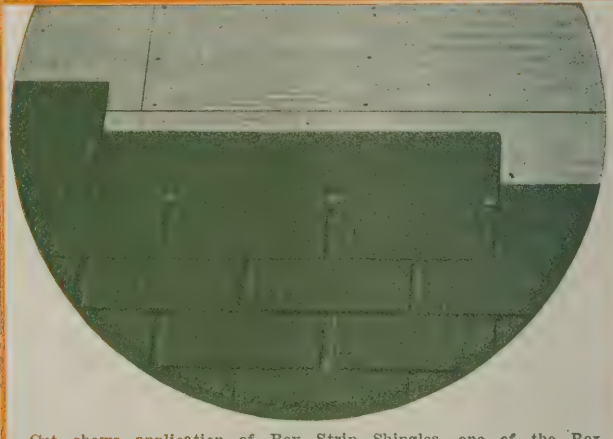
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98 Pearl Street, Boston, Mass.
651 Peoples Gas Building, Chicago, Illinois
[illegible] Bldg., New York, N. Y.
Hennen Bldg., New Orleans, La.

Twenty cents a copy. Containing colored supplement and plans.

BUILDING AGE

October, 1916



HOUSE IN GREENWICH, CONN

Hudson Strip Asphalt Shingles



Save Money and Time

Can be laid in less than ½ the time and with less than ⅔ of the nails that it takes to lay other shingles. Labor cost is a big item today and it can be greatly reduced by using these shingles.

Send for particulars.

Asphalt Ready Roofing Co.

Dept. 52, 9 Church Street
New York

Send particulars regarding Hudson Asphalt Strip Shingles.

Name .....

Address .....

.....

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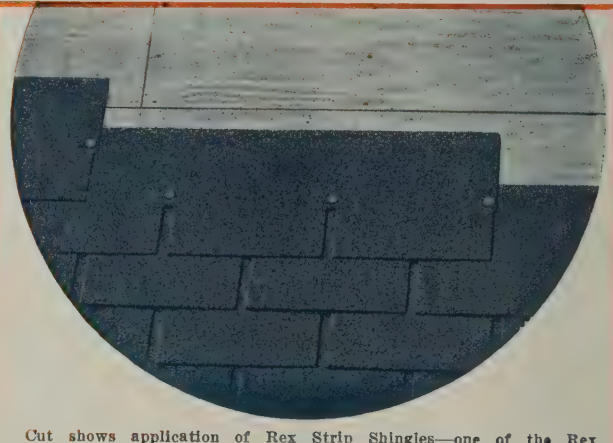
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Send for Our Roofing Catalog

(The largest and most complete ever printed)

The *Rex Products* catalog contains 112 pages and more than 180 pictures and illustrations. Besides complete instructions for laying all styles of asphalt shingles and prepared roofings, you will find in it a full description of each one of the 27 different *Rex Products* which we manufacture. You will also find much helpful information about slate, tile, asbestos shingles, tin and corrugated steel roofings.

We will send you this splendid catalog and a set of samples without cost or obligation to you. Write—

FLINTKOTE MFG. CO., BOSTON, MASS.

28 Pearl Street, Boston, Mass.
651 Peoples Gas Building, Chicago, Illinois
1104 Equitable Bldg., New York, N. Y.
Hennen Bldg., New Orleans, La.

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Twenty cents a copy.

UNIVERSITY OF ILLINOIS

Containing colored supplement and plans.

DEC 6 1916

BUILDING AGE

December, 1916

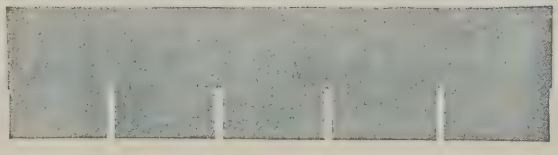


HOUSE IN RIVERDALE, N. Y. MR. DWIGHT JAMES BAUM, *ARCHITECT*

Hudson Strip Asphalt Shingles



Save Money and Time



Can be laid in less than ½ the time and with less than ⅔ of the nails that it takes to lay other shingles. Labor cost is a big item today and it can be greatly reduced by using these shingles.

Send for particulars.

Asphalt Ready Roofing Co.

HUDSON ASPHALT ROOFING PRODUCTS TRADE MARK

Dept. 52, 9 Church Street
New York

Send particulars regarding Hudson Asphalt Strip Shingles.

Name .....

Address .....

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Wood-Mosaic Hardwood Floors

The best made. We make all kinds and thicknesses, Wood-Carpet, Strips, Plain and Ornamental Parquetry, Tongue-and-groove Flooring. Our 5/16" Flooring can be laid in old or new houses.

Send accurate measurements for colored sketch and exact estimate of cost. Instructions for laying accompany all orders shipped.

Send for free copy of our catalogue in natural wood colors

Wood-Mosaic Company

32 Hebard St., Rochester, N. Y.

Saw Mill and Flooring Factory, New Albany, Ind.
Sales Office and Parquetry Factory, Rochester, N. Y.

Bay State "Agatex"

Makes Better Cement Floors

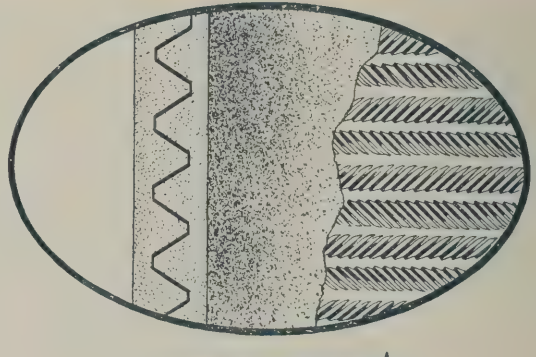
Rough cement floors have a tendency to be damp, to dust and to wear away unevenly. Dampness and dust are detrimental to health and comfort and to the room's contents. These drawbacks are easily overcome by using **Bay State "Agatex."**

This is a cement floor filler which is wearproof, dustproof, oilproof and waterproof. Easy to apply and economical. One gallon will coat 400 to 450 square feet on floors of ordinary texture and condition. Bay State "Agatex" is extremely long wearing.



Write for circular 19 giving detailed information about Bay State Agatex.

WADSWORTH, HOWLAND & CO., Inc.
Boston, Mass.
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"Trussit"

For Solid Partitions

Trussit reinforcement is expanded in both directions alike and woven back and forth through the concrete slab, giving uniform strength and ample stiffness and rigidity to make studding unnecessary.

This rigidity and strength permit the erection of Trussit partitions but two inches in thickness that are space-saving and wonderfully rigid, and of curtain walls the equal of brick or poured concrete at a fraction of their cost.

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The Fireproofing Handbook illustrates and describes the many uses of Trussit. Write for a copy.

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The General Fireproofing Co.

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—and the same principles in use when the pyramids were built, used in building construction ever since, and *today* acknowledged the most efficient, are combined in that modern, dependable background for stucco, cement or plaster finished houses

THE DOVETAILED KEY "LOCKS THE PLASTER"
BISHOPRIC STUCCO OR PLASTER BOARD
TRADE-MARK REGISTERED

Bishopric Board will not corrode—it cannot break away or sag. It contains nothing but creosoted lath, asphalt-mastic, and heavy fibre board, that will outlast any materials known, that is proof against moisture, vermin, heat and cold, and that holds the stucco in its dovetailed grip so it can't crack, loosen or let go.

Bishopric Board costs less than other backgrounds and saves at least 25% in material and labor.



Our book
"Built on the Wisdom of Ages"

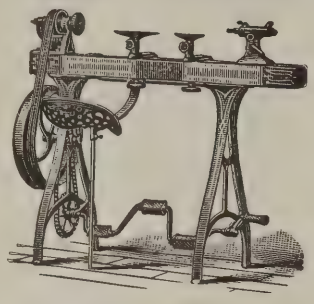
gives facts and figures to prove our claims. It also illustrates homes, apartments, factories and public buildings constructed with Bishopric Board, and gives letters from architects, builders and users, also some interesting results of scientific tests.

Write today for samples and this book—*all free.*

The Mastic Wall Board & Roofing Co.

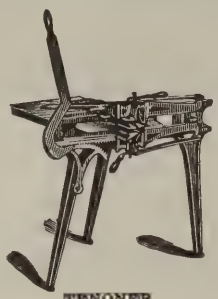
853 Este Avenue **Cincinnati, Ohio**

Hand-Power-Foot WOOD-WORKING MACHINERY



No. 3 LATHE

A Complete Line for a Carpenter and Builder



TENONER

Our Machines are so constructed that you can take them to the house you are building. Saves Time



No. 2 SCROLL SAW



No. 7 SCROLL SAW

Why buy these Machines? BECAUSE

You can save a millman's profit.
You can make more money with less capital invested.
You can manufacture in as good style and finish, and at lower cost than the mill.
You can work up stuff ahead in winter for the spring rush in building.

10,000 builders are using from one to eight of our different machines.

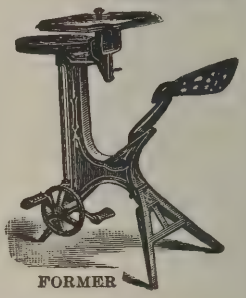
Any of our machines will pay for themselves in a year and often in a single job.



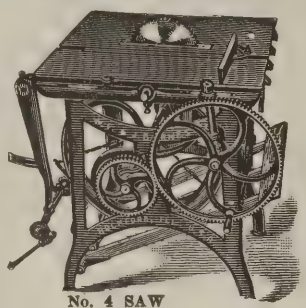
MORTISER

Our machines are not complicated, but simple, strong, practical and built for good hard work.

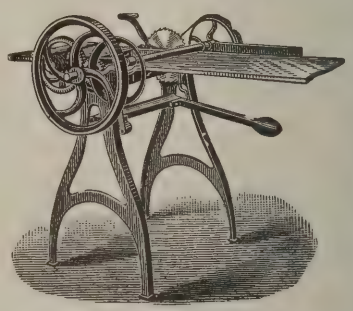
Send for Catalogue and Prices.



FORMER



No. 4 SAW

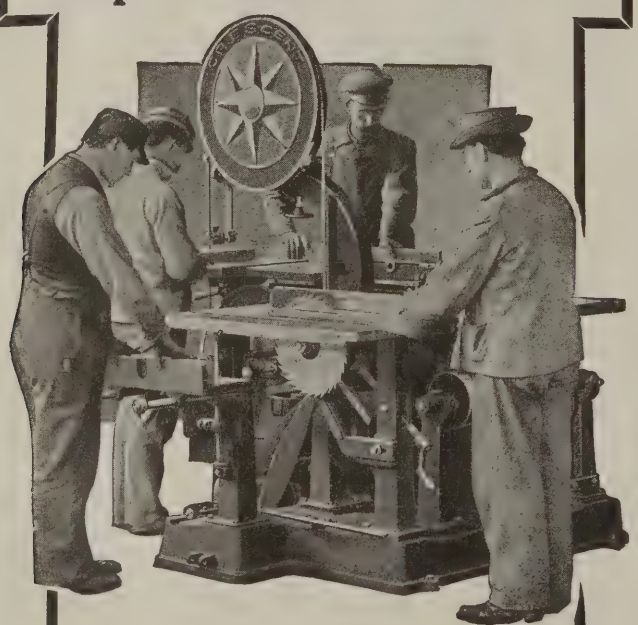


HAND RIP SAW

W. F. & JOHN BARNES CO.

71 Ruby St., Rockford, Ill.

Keep Your Men BUSY



A Combination Hard to Beat

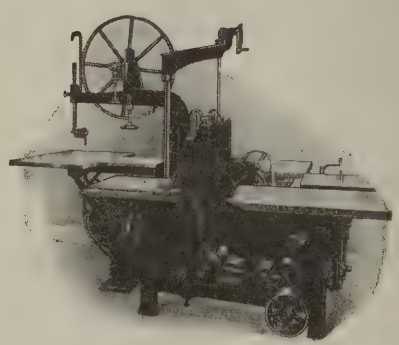
With the Crescent Universal woodworker you can keep four men busy on one machine, each one doing a separate and distinct piece of work. It enables you to get your work out on time.

Write for catalog telling about this splendid machine and our line of band saws, jointers, saw tables, planers, planers and matchers, disk grinders, swing cut-off saws, shapers, borers, hollow chisel mortisers, variety woodworker.

The Crescent Machine Co.

206 Main Street Leetonia, Ohio

"Famous"



For the Large or Small Contractor In the Shop or on the Job

The Famous Universal Woodworker is a machine whose multiplicity of utility makes it an asset potent in its advantages.

So designed that almost any desired equipment may be combined in one machine, and thirty or more different kinds of work can be done successfully by one equipment.

The impossibility of this accomplishment on any other machine is well known.

The Sidney Tool Co., Sidney, Ohio



A NEW motor car provided by Santa may provide **you** with the opportunity to build a garage.

No feature of your garages deserves more careful consideration than the doors.

Stanley Garage Hardware

insures doors that work easily and conveniently

SLIDING doors do not, as a rule, prove satisfactory. They have an annoying tendency to stick and get out of order, they cannot be made weather-tight, and the tracks frequently become clogged with snow or dirt. These troubles are avoided if you swing your doors on ball-bearing Stanley Garage Hinges, and secure them with Stanley Garage Latches and Bolts. The Stanley Garage Door Holder, pictured above, makes it impossible for your doors to slam against the car as it enters or leaves the garage.

Write today for the Stanley Garage Hardware Catalog E12. It contains information of great value to builders.

Any of the better Builders' Hardware stores can show you Stanley Garage Hardware.

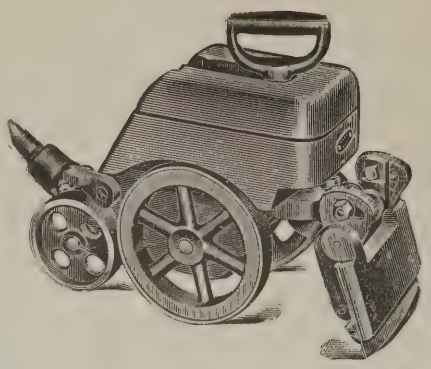
Stanley Works

New Britain, Conn., U. S. A.

New York
100 Lafayette St.

Chicago
73 East Lake St.

Quality vs. Price



It costs no more to advertise and sell a good article than it does an inferior one. Consequently, when you buy a good article you pay only as much more for it as the difference in material and manufacturing cost necessitates.

Anyone who has ever used a Triple "A" will tell you that it is easily the best floor surfacing machine on the market. With this machine it is comparatively easy for a carpenter to scrape from 200 to 400 square feet of floor space per hour and do good work.

Those who are not familiar with the wonderful speed and power supplying features of the Triple "A" Spring Motor will say "Impossible."

You can never believe what a big help the spring motor really is on a floor surfacing machine until you have actually tried it for yourself.

In comparison with other hand power machines, the Triple "A" Spring Driven will surface three (3) times the amount of floor space without a bit more effort on the part of the operator.

That is the big difference, compared to which the difference in price is a mere trifle.

In addition to its remarkable work performing capacity, the Triple "A" is also famous for the superior quality of the work it does, its ease of operation and its many convenient adjustments.

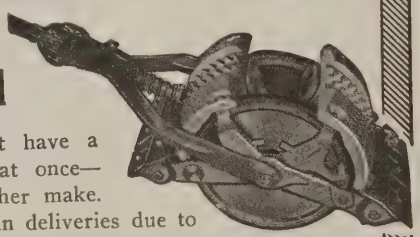
Send for booklet fully describing this highly efficient floor surfacing machine.

To prove our claims we will gladly send you a machine on FREE TRIAL

Triple "A" Machine Company, 4101 Ravenswood Ave. Chicago

The WEBER DOUBLE ACTING Floor Scraper

Big Demand



If you must have a floor scraper at once—order some other make. We're behind in deliveries due to the unusual demand.

If you want a Weber, order NOW and we'll ship in about 15 days.

WEBER MFG. CO., West Allis, Wis.
Office: 684-686 73rd Ave. Factory: 672 71st Ave.

SURFACE YOUR FLOORS

The

"American Universal" Way

Saves Time **Saves Money**
Does Better Work

Here is a machine that does the work of SIX MEN and surfaces floors as smooth as glass. No waves or imperfections in your floors when an "American Universal" is on the job.

Let us send you catalog and tell you all about our

FIVE DAYS' TRIAL



American Floor Surfacing Machine Co.
521 S. St. Clair St.
TOLEDO, O.

"Acme Brand"

⅜" by 1¼", 1½" and 2" face White or Red Oak Flooring

FLOORING

Quarter Sawed, $5.00 per 100 square feet.
Plain Sawed, $4.00 per 100 square feet.

Here is the greatest bargain ever offered in Oak Flooring. Made of high-grade, thoroughly kiln dried lumber, with modern machinery, by men who know how to make flooring that will save the carpenter many hours of hard labor in doing first-class work.

Add one-third to the number of square feet to be covered and be convinced by sending a trial order. There is not one foot waste in a thousand feet, because it is all side and end matched.

Shipments are made same day order is received, and you will find our flooring will save you many dollars.

PAUL O. MORATZ
Main and Washington Sts., Bloomington, Ills.

Smaller Quantities on the Same Basis

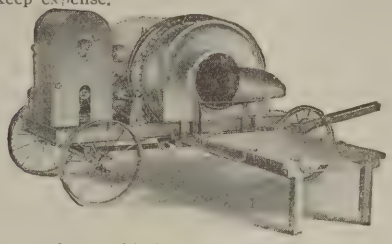


Fewer Hands—Less Pay-Roll—More Work

Is the inevitable result of owning a good, fast working, reliable Concrete Mixer.

No Delays—No Trouble—No Lost Time

is the result of selecting a machine of known quality—one that you perhaps pay a bit more for at the start, but by so doing avoid future up-keep expense.



Just such a machine as this is the

Oshkosh Low Loader

The Oshkosh is light and strong, and easily moved from job to job.

It is four motion and a quick turner of batches.

It is economical because so little attention is required in its successful operation.

It is all ready to be shipped on a wire's notice. And it makes good with you or we do.

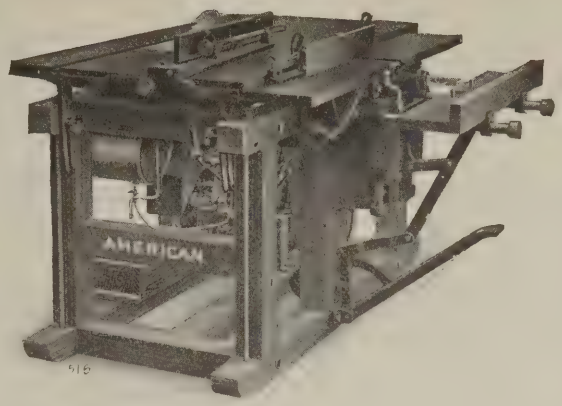
Send for literature and our latest booklet "Facts and Figures for Cement Men"

MEMBER OF NATIONAL ASSOCIATION MIXER MNFRS

Oshkosh Mfg. Co., 125 Buck Street Oshkosh, Wis.

Chicago—1440 Monadnock Block

Dodge & Dodge,
140 West 38th Street, New York



You Get Your Money's Worth in the

"AMERICAN"

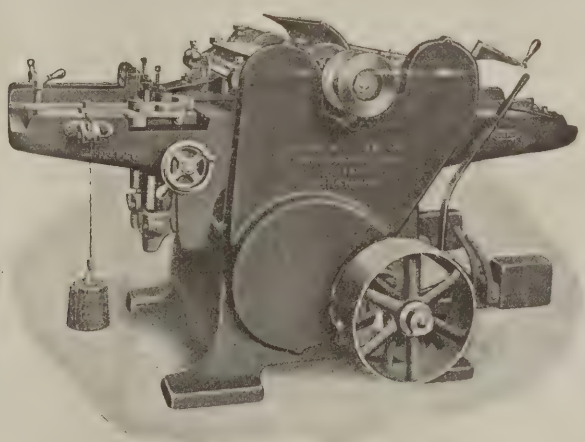
CONTRACTORS' PORTABLE VARIETY **WOOD-WORKER**

Not alone in the 18-in-1 combination of machines it gives you—or in its four-man feature—but also in the "American" quality manifested in high-class design and finish—sturdy, dependable construction—and refinements of control and convenience—found in no other wood-worker.

Be convinced—Send for New Bulletin 67

American Saw Mill Machinery Co.

1362 Hudson Terminal NEW YORK CITY



DO YOUR OWN MILLWORK!

—A Fay-Egan "LIGHTNING" No. 2 or 126 Matcher will surface up to 24" wide—6" thick—match 12" wide—will make all your flooring, ceiling, siding, casing, or any kind of moulding up to ½" and 1¼" deep.

Bulletins free upon request

J. A. FAY & EGAN CO., 221-241 W. Front St., Cincinnati, Ohio

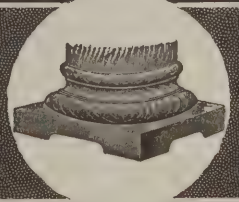


The Zimmerman Iron Base

This is the ONLY BASE having a CENTRE-BEARING. It carries the required weight without allowing the corner supports to sink into the floor, and prevents the base of columns and floor from rotting.

Notice the Open Centre for Ventilation

Manufactured by
S. CHENEY & SON, *Dept. B*, Manlius, New York



The Shingles of our Grandfathers

HAMMER LBR. CO.

Were made of Clear Heart Swamp Cypress—rived and shaved by negro slaves—entirely by hand.

Today—we are making our "HAMMER" Brand Split and Shaved Cypress Shingles in precisely the same manner as in olden times.

Modern methods of grading and inspecting bring this old fashioned product up to the highest present standards, and insure the home-builder of a uniformly perfect shingle, as far as quality goes. But it still leaves the slight variations which give character and charm to this truly Colonial product.

Made in two sizes—½" x 6" x 20" and ⅝" x 7" x 24".

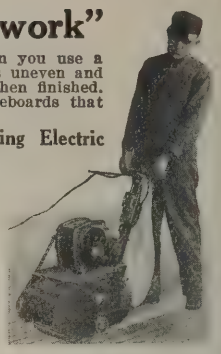
The HAMMER LUMBER CO., Franklin Bank Bldg. Philadelphia

Stop Making "Borderwork"

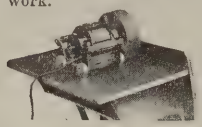
around your baseboards—which results when you use a narrow edge roll attachment, as its work is uneven and looks different from the rest of the room when finished. Get the same uniform work right up to baseboards that you do throughout the room by using

The Improved Type Automatic Ball-Bearing Electric

Floor-Surfacing Machine



The sanding roller is mounted so one end extends just beyond the side of the machine—easily adjustable to either side so that the wall all around the room can be reached and the **Little Automatic Electric Surfacing Machine** (shown below) is a wonder for removing old varnish from desk tops, tables, counters, etc., as well as for dressing up new work.



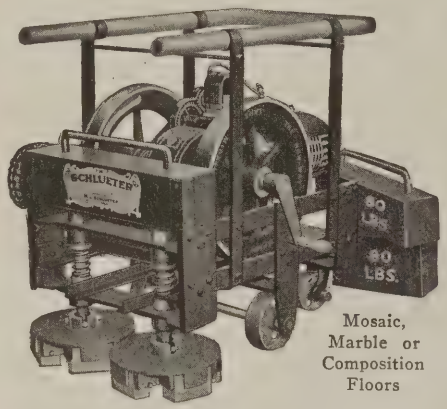
FREE TRIAL OFFER

on either of these machines. Write today for full information.

WAYVELL, CHAPPELL & COMPANY
358 W. Madison St., Dept. E, Chicago, Illinois
Phone Franklin 4160

FREE TRIAL

RAPID, FLEXIBLE, AUTOMATIC ELECTRIC FLOOR SURFACERS



Mosaic, Marble or Composition Floors



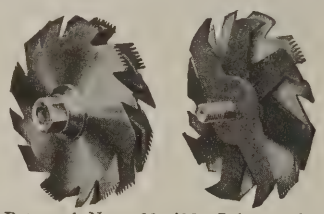
Old or New Wood Floors

Both Machines in several sizes.

Send for our proposition.

M. L. SCHLUETER, 235 W. Illinois Street, Chicago, Ill.

Fits Any Saw Mandrel



Patented Nov. 29, '92; July 19, '10

A Huther Bros. Dado Head consists of two outside cutters and enough inside cutters to make the required cut. This Head will cut perfect grooves, with or across grain, any width. It is an easy Head to keep in perfect condition, has a simple quick adjustment, and may be enlarged any time after purchase. Sent on approval and if not satisfactory return at our expense.

Write for New Illustrated Catalog.



Grooves Cut with Huther Bros. Dado Heads

HUTHER BROS. SAW MFG. COMPANY, Inc.
2500 University Avenue Rochester, N. Y.

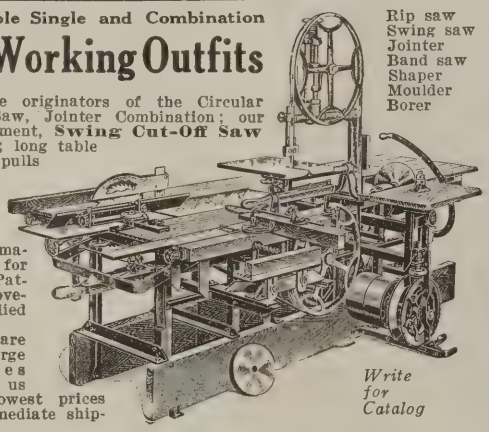
Parks Portable Single and Combination

Wood Working Outfits

Rip saw
Swing saw
Jointer
Band saw
Shaper
Moulder
Borer

We are the originators of the Circular Saw, Band Saw, Jointer Combination; our latest improvement, **Swing Cut-Off Saw** on same base; long table surface; saw pulls across timber instead of pushing long timbers across saw. All machines ready for instant use. Patents on improvements applied for.

Machines are made in large quantities which enables us to sell at lowest prices and make immediate shipment.



Write for Catalog

Parks Ball Bearing Machine Co., Station A Cincinnati, Ohio

Van Guilder Hollow Wall Concrete Construction

"Built Like a Thermos Bottle"

Van Guilder hollow wall machines build a two-piece hollow wall, using wet mix concrete, molding a 9-inch course 4½ feet long at each operation, and being immediately released and moved forward on the work.

These machines are used in all classes of building construction from bungalows and garages to factories and apartment houses.

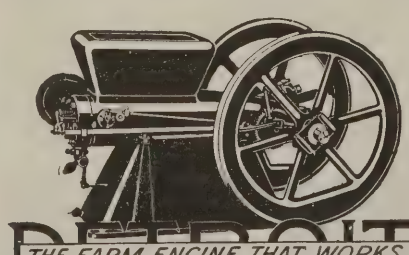
Van Guilder buildings are warm in winter, cool in summer and always dry. Van Guilder construction competes in price with the cost of frame.



Write for booklet describing Van Guilder construction in detail.

Van Guilder Hollow Wall Co.
712 Chamber of Commerce Bldg.
Rochester, N. Y.

Gasoline and Kerosene



Built and guaranteed by the largest producers of farm engines — simple, durable, powerful —four cycle, suction feed, make and break ignition — every part interchangeable — fully tested. Guaranteed to Develop Rated H. P.

SAVES FUEL TIME, LABOR MONEY

Lowest Price Greatest Value

Write for big illustrated Engine Book today.

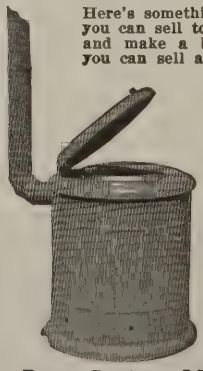
Full Line Detroit Engines 2 horsepower up

Detroit Engine Works, 473 Bellevue Ave., Detroit, Mich.

Wadsworth Mfg. Co., Successors

MR. BUILDER:—Increase Your Income Right Now—This Month

Here's something right in your line—a Chemical Closet that you can sell to a home builder cheaper than a wooden privy and make a bigger profit for yourself. Here's something you can sell at odd times or turn over to your son or your foreman to sell.



RO-SAN Chemical Closet

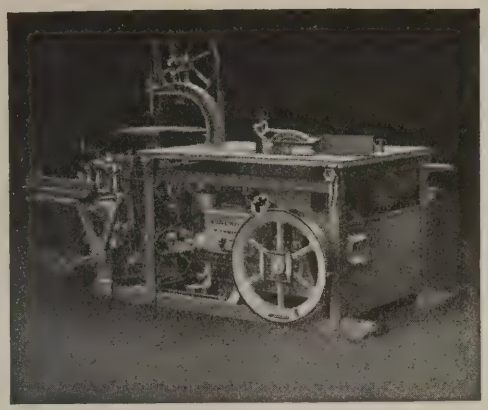
An absolutely sanitary, odorless indoor closet that may be placed anywhere in the house. Abolishes the germ-breeding outdoor vault. A comfort and a convenience where there is no sewer connection. Germs killed by chemical. Easily emptied as the ash pit of a stove.

AGENTS WANTED

We want one live carpenter contractor in each town to act as our agent. Hundreds of builders are selling these fixtures. Good profits for little work. We help you sell them. Write today for complete details.

Rowe Sanitary Mfg. Co., 1203 Sixth St., Detroit, Mich.

Ask about the Ro-San Washstand. Hot and cold running water without plumbing.



The C. H. & E. No. 6 Outfit

It's Mighty Convenient

to have—right there—ready to start at a moment's notice—

The C. H. & E. Portable Saw Rig

a complete woodworking mill.
Other sizes of Saw Rigs and Hoists, Elevators, Pumps, Mixers, Engines, etc.
Send for Catalog.

C. H. & E. Manufacturing Co.
330 Mineral St. **Milwaukee, Wis.**

Almetal STORE FRONTS

SIMPLICITY

EVERY part of Almetal Store Front construction is simple in design and simple to install. Every part is built to perform its function in the most natural way.

THE sash, for instance, is so built that the glass is held without strain. Its principle has been used since glass became a part of building. Builders have always favored this simple construction. The possibility of glass breakage is reduced to the minimum.

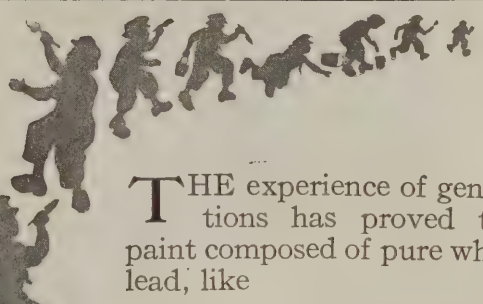
THE two-piece corner bars also follow that same simple method of safely holding to joining plates of glass.

STURDINESS, simplicity, attractiveness and safety are built into every part of Almetal construction.

WHY not have Almetal details on file? You'll find them easy to use on your next Store Front job.

DETROIT SHOW CASE CO.
483 Fort St., West, Detroit, Mich.
(We also make the well-known Petz Construction)

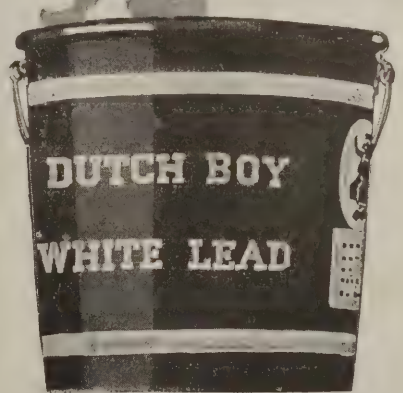




THE experience of generations has proved that paint composed of pure white-lead, like

Dutch Boy White-Lead

is unsurpassed for inside as well as outside use. Its beautifying and durable qualities have made it a standard wherever used.



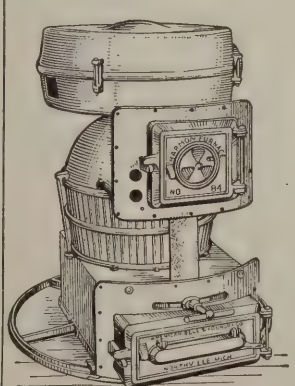
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There's no need of figuring any further until you know whether your prospect wants his heating system piped or pipeless.

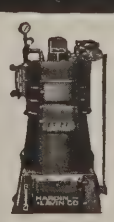
We can satisfy him either way. Illustration shows our Harmon Piped Furnace—all cast iron as you see it, without the casing.

May we help with your specifications?

American Bell & Foundry Co.
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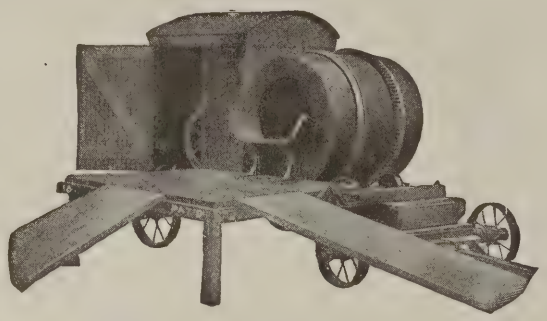
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Will enable you to rush your concrete work before cold weather on account of the low charging platform which is only 24" high. It avoids the necessity of using troublesome and heavy side loaders or high charging hoppers.

For concreting in cold weather "The Standard" can be placed inside the building and moved along the work and from floor to floor. Its light weight and sturdy construction make this possible.

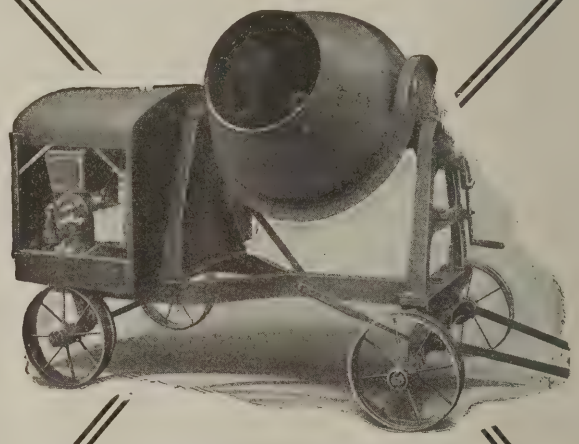
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No Job Too Big or Too Small

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3 Sizes—14 Styles

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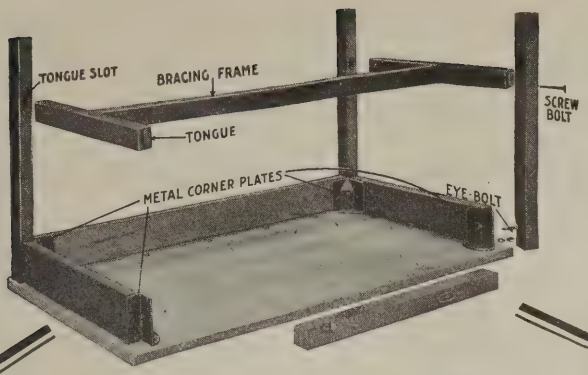
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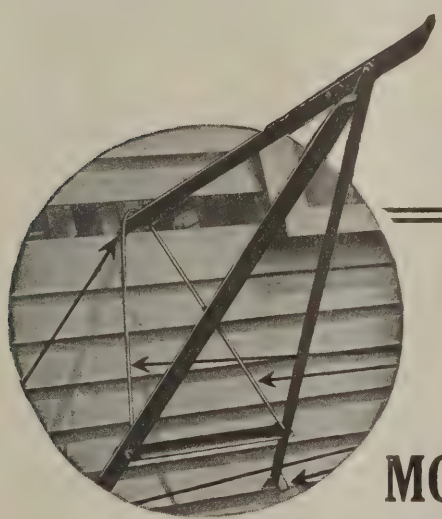
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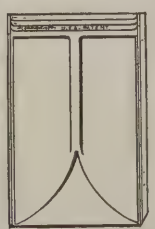
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STANDARD STAINED SHINGLE CO.
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Fig. 1—Spokes into rim ready for casting the hub.

If you knew what I know about the difference between WHEELBARROWS you would throw out every other kind and order a full equipment of



Fig. 3—Stationary steel axle and malleable end brackets.

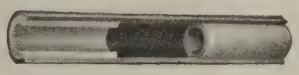


Fig. 2—Pre-Lubricating fibre bushings.

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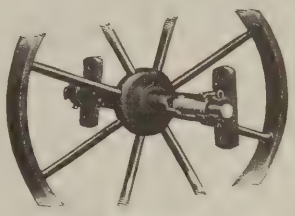
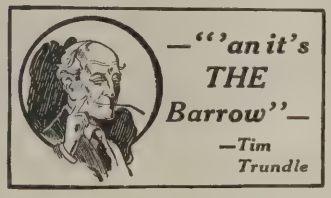


Fig. 4—The completed wheel



You wouldn't wait to write —you'd telegraph

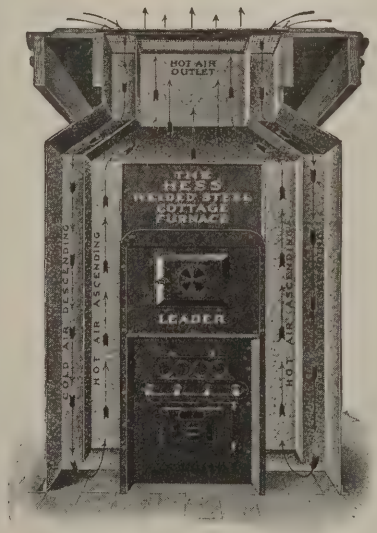
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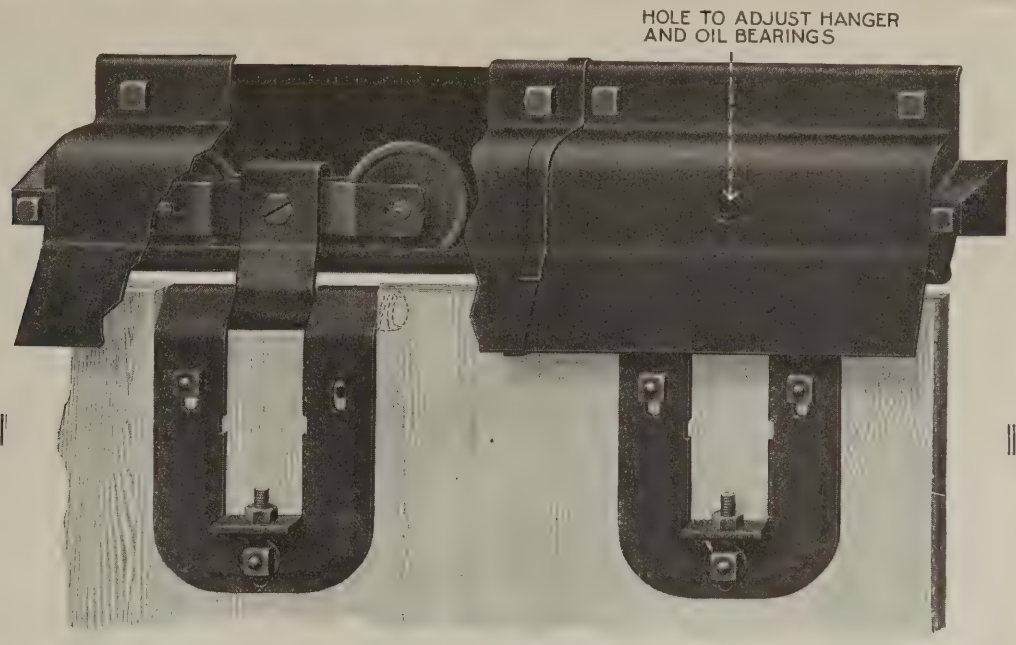
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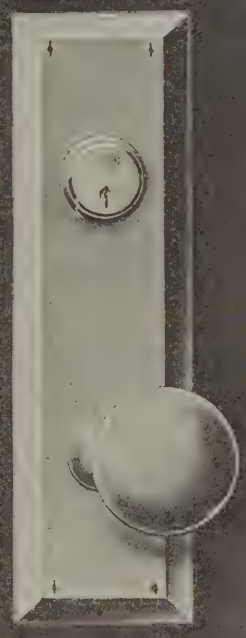
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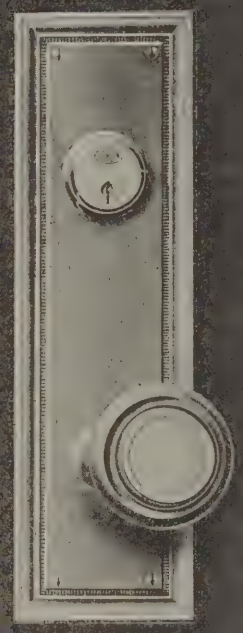
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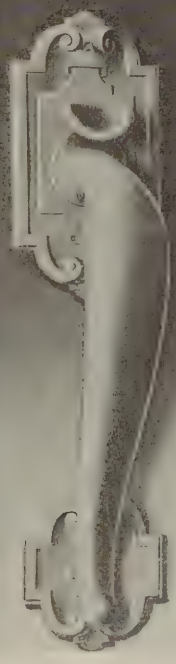


OAKLAND





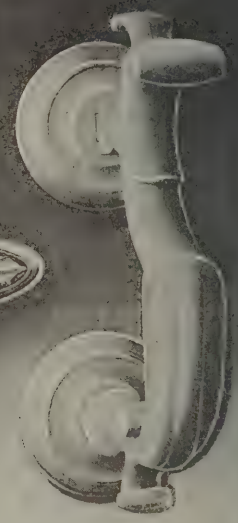
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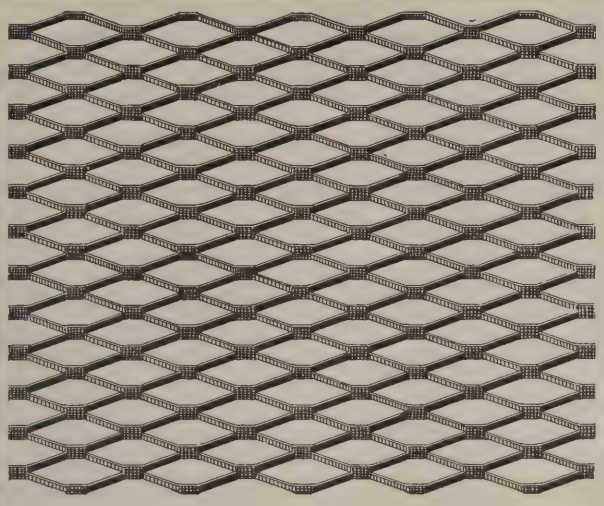
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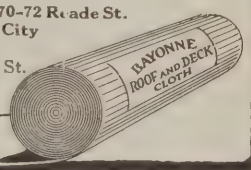
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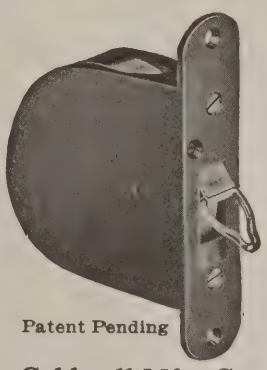
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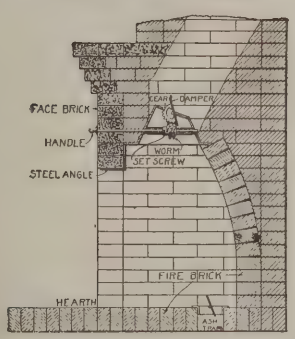
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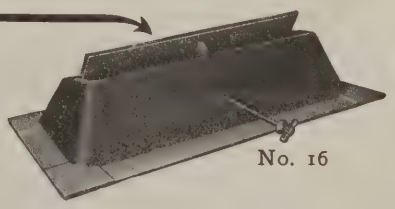
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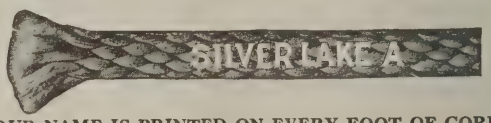
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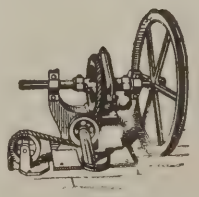
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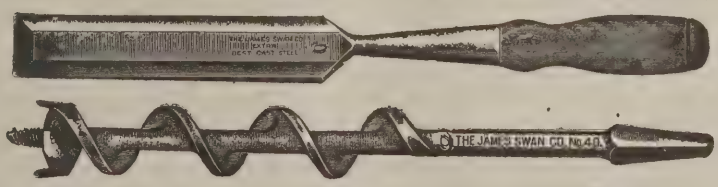
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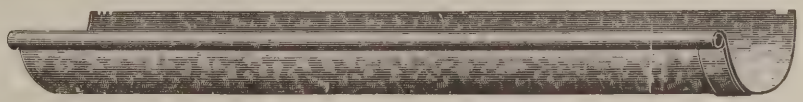


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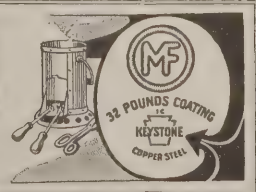


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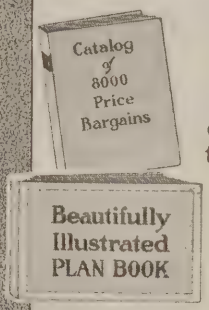
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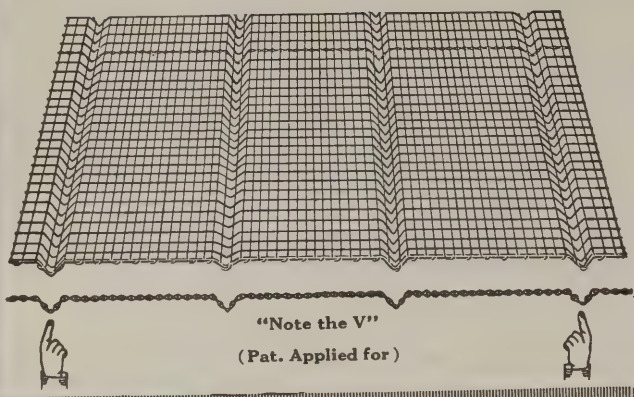
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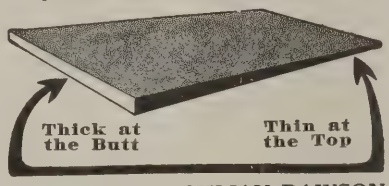
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That is the kind of a roof you or any other contractor wants to lay. It will not only make the owner of the job a big booster for your work, but it will also make boosters out of everyone seeing it.

"Columbia" metal shingles are made of good quality roofing tin. Watertight and artistic; easily applied; moderate price. Write for beautifully illustrated catalog.

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San Francisco Brooklyn, N. Y.



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Build a Roof That Will *Build* Your Business

by its beauty and efficiency. Because the roof is the most prominent part of the building—exposed to flying firebrands, to storms, freezes, rains, droughts and scorching suns. Because of all these things, give your clients a roof of

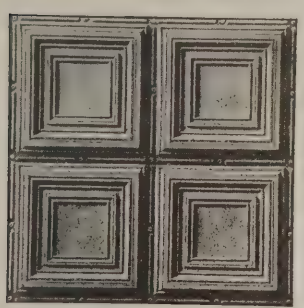
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See Page Ad Elsewhere in this Journal



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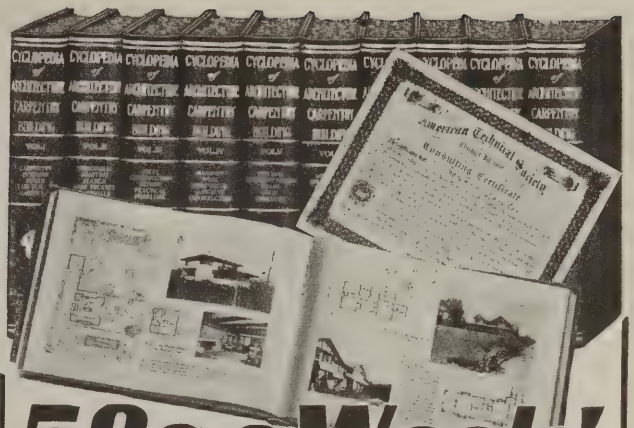
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This advanced step in manufacture is responsible for the superiority of Berger's "Classik" Steel Ceilings.

Install them in your buildings. Write for particulars and Catalog D. B.

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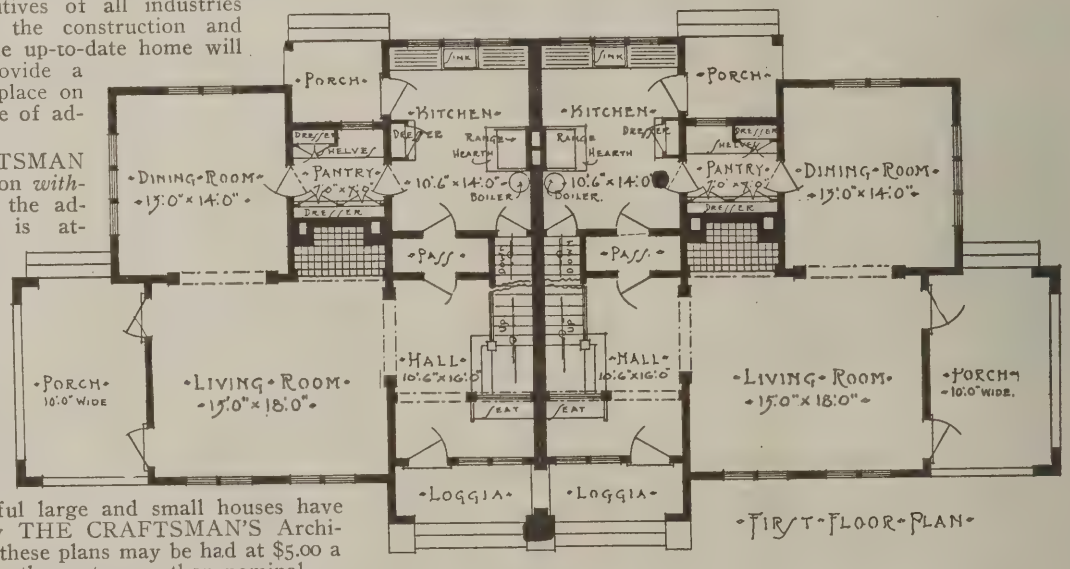
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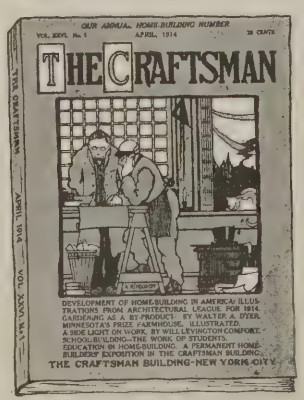
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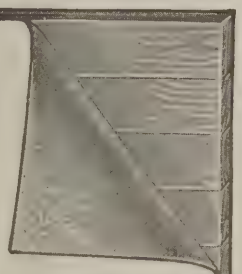


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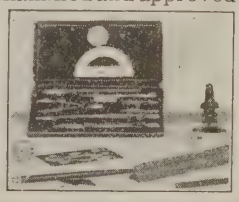


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On account of the rapidly increasing demand for trained draftsmen, this college has set aside a limited number of free scholarships and will give the regular $45 course in **MECHANICAL DRAWING FREE** with any one of the Home-Study Courses named in the coupon below; this is in addition to the complete $15 Drawing Outfit which is also furnished to students free. Take advantage of this unusually liberal offer today, as it will be withdrawn when the allotted number of Free Scholarships has been awarded. It costs you nothing to get full information. No obligation on you.

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DR. J. W. DREYER, OWNER; JOHN ARMBRUSTER, CONTRACTOR

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No. 435 R-W Sliding-Folding

Garage Door Outfits

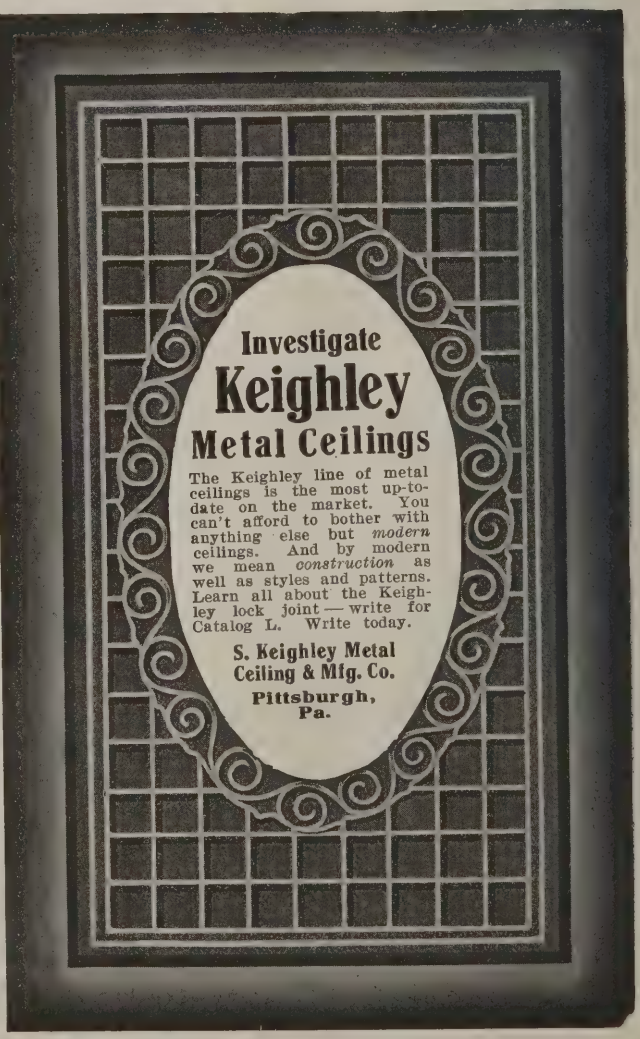
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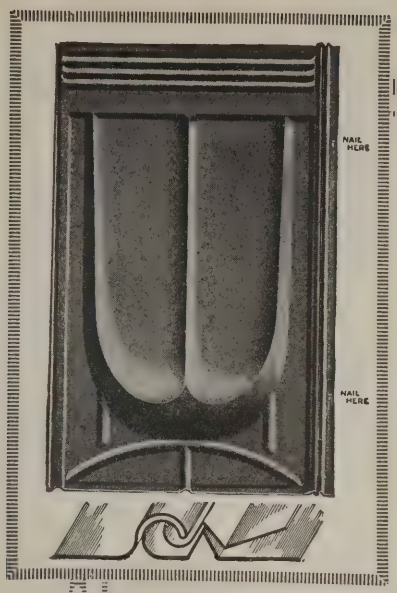
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Richards-Wilcox

"A hanger for any door that slides"

MANUFACTURING CO.
AURORA, ILL. U.S.A.





The big Edwards' Metal Shingle family is growing fast. One of our late arrivals is here shown. Look it over. Did you ever see a more handsome, novel design, or more clean cut embossing? We've christened this "Baby" after our own great state.

Edwards "Ohio" Metal Shingle

This stunning pattern is made in one size only, 14 x 20 inches. Manufactured from the best quality Worcester Grade Terne Plate, painted or "Tightcote" galvanized. Every good Edwards Shingle feature—and there's a big bunch of them, including our famous patent interlocking device—is in the "Ohio," of which we are justly proud. *Let Us Send Samples and Agent's Proposition*—The high quality of the former will please you and the low prices will surprise you. You ought to see the "Ohio" and you ought to see it now. Act!

The Edwards Manufacturing Co.

"THE SHEET METAL FOLKS"

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New York Office: 81-83 Fulton Street

Branch Office and Warehouse: 1625-27 Pacific Avenue, Dallas, Texas.

Largest Manufacturers of Metal Ceilings, Metal Shingles, Steel Roofing and Siding in the World

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Send me details of your agency plan and a copy of your Metal Shingle Booklet. B. A.

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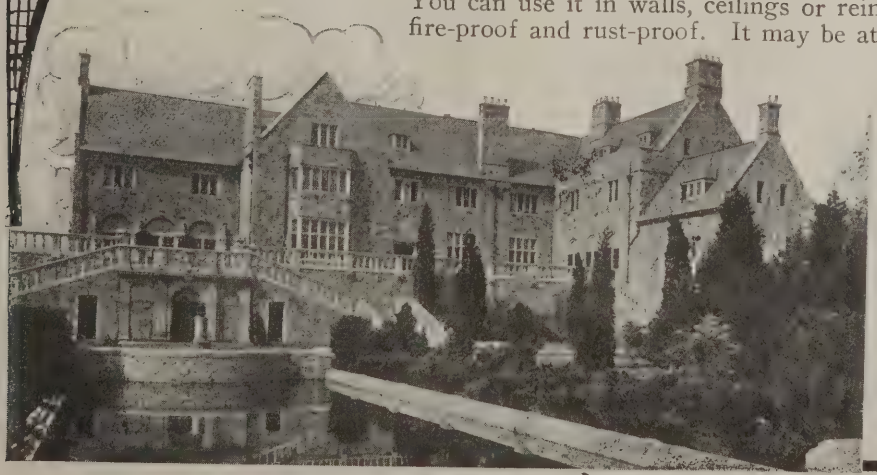
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You can use it in walls, ceilings or reinforcing concrete floors. It is fire-proof and rust-proof. It may be attached to any type of wooden framework by tie wire.



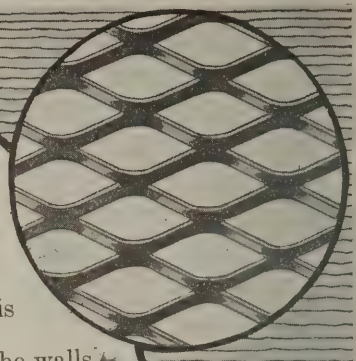
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For Walls That Last

Berger's Expanded Metal Lath



YOUR reputation as a reliable builder depends on the lasting qualities of the buildings you erect. This in turn depends on the material you use.

For instance, a bad impression of your ability is left if the walls crack or stain and need frequent repairing.

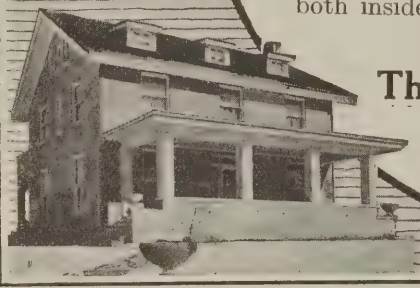
Plaster your walls on a secure foundation—Berger's Expanded Metal Lath—and you will prevent unsightly cracks and falling plaster.

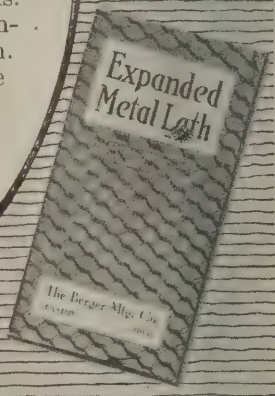
Berger's Expanded Metal Lath does not absorb moisture, hence cannot swell, warp or stain the plaster. It is fire resisting, sanitary, sound proof, and prevents rats and mice from making holes thru the walls.

The small diamond-shaped meshes allow a perfect "key," completely imbedding the lath in the plaster, giving great strength.

The large sheets (8 feet long and 18 and 24 inches wide) make application easy and speedy.

Build for durability—use Berger's Expanded Metal Lath for both inside and outside walls.



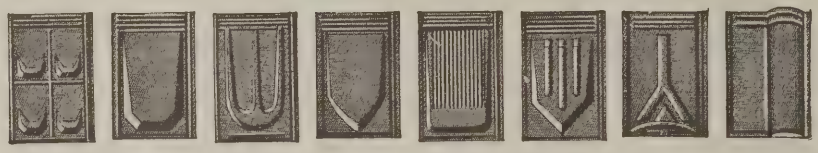


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The Berger Manufacturing Co.
Canton, Ohio

Branches:—Boston New York Philadelphia Chicago St. Louis Minneapolis San Francisco Los Angeles
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Walter's and Cooper's Painted Tin Shingles

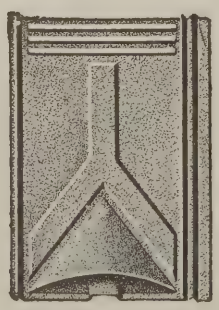


THE SHINGLES THAT LAST

This is the Roofer's Opportunity

We require an agent in your town; may we have the pleasure of sending you a selling proposition, the acceptance of which will put you in a way to unusual profits?

Why use high priced Galvanized Roofing?



Walter's and Cooper's Painted Tin Shingles will make a roof just as lasting and cost you about one-half as much.

A painted tin shingle to be enduring must have as its base a heavily coated sheet of roofing tin, well covered with a lasting coat of paint. This paint must be flexible and dry, tough and hard. On exposure to the sun it must not flake, chip or scale.

Walter's and Cooper's Interlocking Tin Shingles

are stamped from the best grade of roofing tin, and are individually coated by the dipping process in a bath of paint to the above specifications.

Walter's and Cooper's Painted Tin Shingle roofs put on over thirty years ago are in as good condition today as when first put on the roof. Not only are they long lasting, but they are fire, wind, snow, storm and lightning proof, and are sold under an ironclad guarantee that they are right in every way.

National Sheet Metal Roofing Co., 339-345 Grand Street JERSEY CITY, N. J.



Walls that Yield

THE wonderful elasticity of KELLASTONE (Imperishable Stucco), which may be deflected as much as one and one-half inches in seven feet without cracking, is only one feature of this remarkable material, which will make an everlasting hit with every customer you have. Note, please, these eight points:

1st—**Its Elasticity.**

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